A member of the
Avery Weigh-Tronix Group

# Model 350 and Model 355

## Digital Weigh Indicator Series

## Service Manual

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# 1 General information and warnings

## 1.1 About this Manual

This manual is divided into chapters by the chapter number and the large text at the top of a page. Subsections are labeled as shown by the 1 and 1.1 headings shown above. The names of the chapter and the next subsection level appear at the top of alternating pages of the manual to remind you of where you are in the manual. The manual name and page numbers appear at the bottom of the pages.

### 1.1.1 Text Conventions

Keystrokes are shown in brackets e.g. [PRINT] and reflect the case of the key being described. This applies to the keys on the front keypad.

Displayed messages appear in *italic* type and reflect the case of the displayed message.

### 1.1.2 Special Messages

Examples of special messages you will see in this manual are defined below. The signal words have specific meanings to alert you to additional information or the relative level of hazard.

***DANGER!***
***THIS IS A DANGER SYMBOL.***
***DANGER MEANS THAT FAILURE TO FOLLOW SPECIFIC PRACTICES OR PROCEDURES WILL CAUSE INJURY OR DEATH.***

***ELECTRICAL WARNING!***
***THIS IS AN ELECTRICAL WARNING SYMBOL.***
***ELECTRICAL WARNINGS MEAN THAT FAILURE TO FOLLOW SPECIFIC PRACTICES OR PROCEDURES MAY RESULT IN ELECTROCUTION, ARC BURNS, EXPLOSIONS OR OTHER HAZARDS THAT MAY CAUSE INJURY OR DEATH.***

***WARNING!***
***This is a Warning symbol.***
***Warnings mean that failure to follow specific practices and procedures may have major consequences such as injury or death.***

***CAUSTION!***
***This is a Caution symbol.***
***Cautions give information about procedures that, if not observed, could result in damage to equipment or corruption to and loss of data.***

*NOTE: This is a Note symbol. Notes give additional and important information, hints and tips that help you to use your product.*

## 1.2 Electrical Installation

***CAUTION: The power cable must be connected to an earth-grounded electrical outlet. The electrical supply must have a circuit breaker with an appropriate rating to protect from over-current conditions.***

***For your protection, all electrical (110V or 230V) equipment used out of doors or in wet or damp conditions should be supplied from a correctly fused power source and protected by an approved ground fault protection device (RCD, GFCI etc.)***

***IF IN DOUBT SEEK ADVICE FROM A QUALIFIED ELECTRICIAN.***

### 1.2.1 Pluggable Equipment

Pluggable equipment must be installed near an easily accessible socket outlet.

### 1.2.2 Permanently Wired Equipment - Isolator Requirements

Permanently connected equipment must have a readily accessible disconnect device incorporated in the fixed wiring such as an isolator or circuit breaker with at least 3mm contact separation.

The isolator **MUST NOT** be installed into the flexible power cable supplied with the unit.

### 1.2.3 Safe Handling of Equipment with Batteries

***CAUTION: Danger of explosion if battery is incorrectly replaced. Replace only with the same or equivalent type recommended by the manufacturer. Dispose of used batteries according to the manufacturer's instructions.***

***ATTENTION: Il y a danger d'explosion s'il y a remplacement incorrect de la batterie, remplacer uniquement avec une batterie du même type ou d'un type équivalent recommandé par le constructeur. Mettre au rebut les batteries usagées conformément aux instructions du fabricant.***

### 1.2.4 Wet Conditions

Under wet conditions, the plug must be connected to the final branch circuit via an appropriate socket / receptacle designed for washdown use.

**Installations within the USA** should use a cover that meets NEMA 3R specifications as required by the National Electrical Code under section 410-57. This allows the unit to be plugged in with a rain tight cover fitted over the plug.

**Installations within Europe** must use a socket which provides a minimum of IP56 protection to the plug / cable assembly. Care must be taken to make sure that the degree of protection provided by the socket is suitable for the environment.

## 1.3 Routine Maintenance

***IMPORTANT: This equipment must be routinely checked for proper operation and calibration.***
***Application and usage will determine the frequency of calibration required for safe operation.***

Always turn off the machine and isolate from the power supply before starting any routine maintenance to avoid the possibility of electric shock.

Make sure that it is placed securely on a flat and level surface.

## 1.4 Cleaning the Machine

**Table 1.1 Cleaning DOs and DON'Ts**

| DO | DO NOT |
|---|---|
| Wipe down the outside of standard products with a clean cloth, moistened with water and a small amount of mild detergent | Attempt to clean the inside of the machine |
| | Use harsh abrasives, solvents, scouring cleaners or alkaline cleaning solutions |
| Spray the cloth when using a proprietary cleaning fluid | Spray any liquid directly on to the display windows |

## 1.5 Training

Do not attempt to operate or complete any procedure on a machine unless you have received the appropriate training or read the instruction books.

To avoid the risk of RSI (Repetitive Strain Injury), place the machine on a surface which is ergonomically satisfactory to the user. Take frequent breaks during prolonged usage.

## 1.6 Sharp Objects

Do not use sharp objects such as screwdrivers or long fingernails to operate the keys.

## 1.7 AC and DC Power

### 1.7.1 Battery Operated

The optional battery module gives the Model 350/355 portability, providing a Model 350 with a LCD display and one loadcell 20 hours minimum battery life, or a Model 350/355 with a LED display and one loadcell 8 hours minimum battery life.

#### ON/OFF Switch

The on/off switch for the Model 350 die cast is a rocker-type switch that is located on the rear of the enclosure.

The on/off switch for the Model 350/355 stainless is a toggle-type (washdown type) switch replaces one of the available strain reliefs on the bottom or rear of the enclosure.

The Model 350/355 will immediately switch to battery operation when AC power is interrupted if the switch is in the ON position. Placing the switch in the OFF position prevents the battery from running down when AC power is removed. The battery will be charged whenever there is AC power to the Model 350/355, regardless of the switch position.

### 1.7.2 AC Operated

The AC version does not have an On/Off switch. Plug the indicator into an appropriate AC outlet. Unplug the indicator to turn it off.

## 1.8 Keypad

### 1.8.1 Model 350 Keypad

The Model 350 offers a sealed 5-button elastomer keypad which is used for operator input. Each key is assigned two distinct functions. Various key combinations are also used. Each key has secondary functions; allowing an operator to enter target values, perform piece samples, access setup parameters, etc.

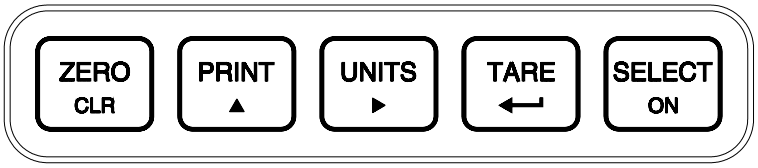



**Figure 1.1 Model 350 Keypad**

The Model 350 keypad performs different functions in the Weigh Mode, the Setup Mode, and the Calibration Mode. Secondary functions for each key allow you to perform additional tasks.

| Key Press | Weigh Mode | Count Mode | Setup Mode |
|---|---|---|---|
| ZERO CLR | Performs a gross zero function and/or clears an entry in progress. Hold this key on power-up to turn on the display if in sleep mode. | Performs a quantity zero function and/or clears an entry in progress. | Exits the Setup Mode and/or answers "NO" to query prompts and/or clears an entry in progress. |
| PRINT ▲ | Performs a print function and/or 'scrolls' through digits during setpoint entry. | Performs a print function and/or 'scrolls' through digits during setpoint entry. | Scrolls through digits during data entry. |
| UNITS ▶ | Toggles between 'lb' and 'kg' and/or advances cursor to next entry position. | Toggles through standard sample sizes and/or begins a new sample entry. | Advances cursor to next entry position and/or cycles prompts. |
| TARE ↵ | Performs an auto-tare function (if enabled) and/or accepts an entry in progress. | Performs an auto-tare function and requests a piece sample and/or accepts an entry in progress. | Accepts an entry in progress and/or scrolls through parameter sub-set selections and/or answers YES to query prompts. |
| SELECT ON | Toggles between display modes and/or restores power to the indicator (if auto-shutoff enabled). | Toggles between display modes and/or restores power to the indicator (if auto-shutoff enabled). | Advances to the next setup parameter. |

| Key Press | Weigh Mode | Count Mode | Setup Mode |
|---|---|---|---|
| ZERO CLR + SELECT ON | Access Setup Mode. Hold these keys on power-up to bypass the remote display mode. | Access Setup Mode. | No function. |
| TARE ↵ + SELECT ON | No function | No function | Return to the previous setup parameter |
| ZERO CLR + TARE ↵ | Absolute clear - clears an entry in progress and/or clears the value of a parameter. | No function. | Clears any entry in progress |
| ZERO CLR + PRINT ▲ | Backspace - erases the right-most digit during data entry. | Backspace - erases the right-most digit during sample entry. | Backspace - erases the right-most digit during data entry. |
| PRINT ▲ + SELECT ON | Extended gross | Extended gross | No function |
| UNITS ▶ + TARE ↵ | Turn off indicator by holding key for approximately 1 second. | Turn off indicator by holding key for approximately 1 second. | Turn off indicator by holding key for approximately 1 second. |
| PRINT ▲ + UNITS ▶ | Reverse character scroll during data entry. | Reverse character scroll during sample entry. | Reverse character scroll during data entry. |

### 1.8.2 Entering a Tare Value (Model 350)

If a tare value is known, it is possible to enter that value into the tare register. Follow the steps below. P167 must be enabled to use this feature.

1. From the gross or net mode press the [SELECT] key until tare is displayed.
2. Use the [PRINT] key to scroll in the first number.
3. Press the [UNITS] key to move to the next digit.
4. Repeat steps 2 and 3 until the desired number is showing on the display.
5. Press the [TARE] key to accept the entered tare value.

### 1.8.3 Entering a Tare Value (Model 355)

If a tare value is known, it is possible to enter that value into the tare register. Follow the step below. P167 must be enabled to use this feature.

1. Key in the known tare value and press [ENTER]. The display will access the net mode.

*If the indicator is being installed in a legal for trade application, refer to chapter 7, Legal for Trade on page 143 for details on the tare feature.*

## 1.8.4 Model 355 Keypad

The Model 355 keypad performs different functions in the Weigh Mode and the Count Mode. The numeric keys make entering values such as tare or average piece weight easier.

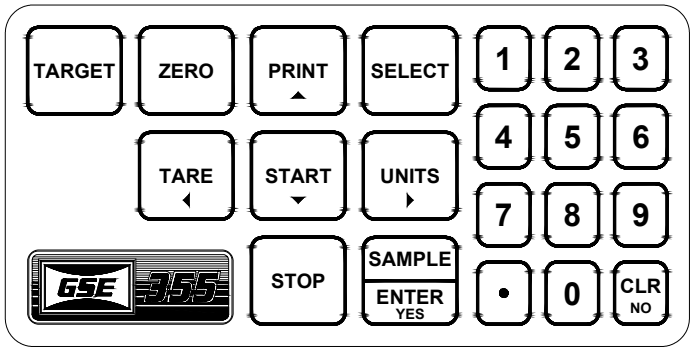



**Figure 1.2 Model 355 Keypad**

| Key Press | Weigh Mode | Count Mode | Setup Mode |
|---|---|---|---|
| ZERO | Performs a gross zero function and/or clears an entry in progress. | Performs a quantity zero function and/or clears an entry in progress. | Exits the Setup Mode and/or answers NO to query prompts and/or clears an entry in progress. |
| PRINT | Performs a print function and/or 'scrolls' through digits during setpoint entry. | Performs a print function and/or 'scrolls' through digits during setpoint entry. | Scrolls through digits during data entry. |
| UNITS ▶ | Toggles between 'lb' and 'kg' and/or advances cursor to next entry position. | Toggles through standard sample sizes and/or begins a new sample entry. | Advances cursor to next entry position and/or cycles prompts. |
| TARE ◀ | Performs an auto-tare function (if enabled) and/or accepts an entry in progress. If the tare weight is known, key in the value and press [TARE]. | Performs an auto-tare function and/or accepts an entry in progress. | Accepts an entry in progress and/or scrolls through parameter sub-set selections and/or answers YES to query prompts. |
| SELECT | Toggles between display modes and/or restores power to the indicator (if auto-shutoff enabled). | Toggles between display modes and/or restores power to the indicator (if auto-shutoff enabled). | Advances to the next setup parameter. |
| SAMPLE / ENTER | Performs a sample. If a number is keyed in before hand, it will be used as the sample size. Accepts an entry. | Performs a sample. If a number is keyed in before hand, it will be used as the sample size. | Accepts an entry |

| Key Press | Weigh Mode | Count Mode | Setup Mode |
|---|---|---|---|
| CLR NO | Clears an entry in progress. | Performs a quantity zero function and/or clears an entry in progress. | Exits the Setup Mode and/or answers NO to query prompts and/or clears an entry in progress. |
| START ▼ | If setpoints are enabled, causes a process to start or resume. | If setpoints are enabled, causes a process to start or resume. | No function |
| STOP | If setpoints are enabled, causes a pause. Press [STOP] again to abort the process. | If setpoints are enabled, causes a pause. Press [STOP] again to abort the process. | No function |
| TARGET | Wake up the indicator if in sleep mode. Turn on the indicator if power is off. Access the target entry mode. | Wake up the indicator if in sleep mode. Turn on the indicator if power is off. Access the target entry mode. | No function |
| ZERO CLR + SELECT ON | Access Local Setup Mode. Hold these keys on power-up to bypass the remote display mode. | Access Local Setup Mode. | No function |

*When the Model 355 keypad is installed with a new main board, the keypad must be initialized. Hold down the [ENTER] key while power is applied. If the keypad was enabled, the display will show "EntHld". To reestablish the keypad as a Model 350, hold down the [TARE] key of the 350 keypad while power is applied by pressing the [SELECT] key.*

## 1.8.5 Weigh Mode Functions

The Model 350 and Model 355 keypads have five primary Weigh Mode functions:

ZERO CLR — Performs a gross zero and selects the gross mode

PRINT ▲ — Initiates data transmission out the communication port

UNITS ▶ — Toggles the units of measure between lb, kg, (g, lb oz, oz if enabled)

TARE ↵ — Tares any displayed weight and selects the net mode

SELECT ON — Toggles the display between GROSS, NET, QUANTITY and setpoint TARGETS (if enabled)

# 1.9 Displays

The Model 350 is available with a LED or LCD while the Model 355 is only available with a LED. The Model 350 and Model 355 will display alphanumeric data, but due to the nature of 7-segment LEDs/LCD and the limitation of six digits, some information is abbreviated.

All segments and annunciators are illuminated for a brief display test upon power up. The current gross weight is then displayed in default units.

## 1.9.1 LED

The LED display is a six digit, 7-segment bright green LED screen with 12 annunciators to show weight and status information. The SP1, SP2, and SP3 annunciators are red, green, and yellow. Also there is an annunciator for a third unit under kg. Place the third unit label above the third annunciator (the third unit is available on both the LED and LCD displays).

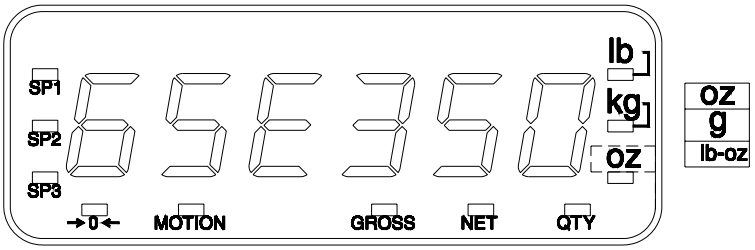



**Figure 1.3 Model 350/355 LED**

## 1.9.2 LCD

The LCD display is a six digit, 7-segment black LCD screen with 12 annunciators and a bargraph to show the operational status.

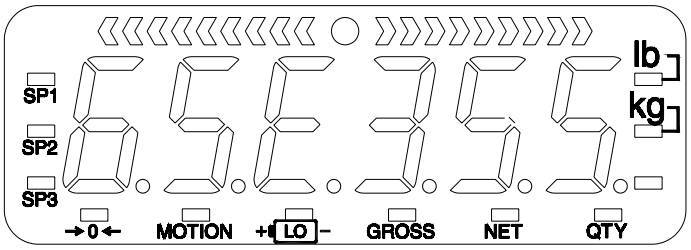



**Figure 1.4 Model 350 LCD**

### 1.9.3 Annunciators

Annunciators provide mode and status information. When illuminated, they indicate the following conditions:

| Annunciator | Description |
|---|---|
| **SP1** | Setpoint #1 activated (relay 1 closed). |
| **SP2** | Setpoint #2 activated (relay 2 closed). |
| **SP3** | Setpoint #3 activated (relay 3 closed). |
| **< 0 >** | Displayed weight is at center-of-zero (¼ display graduation). |
| **MOTION** | Scale is in motion. Motion inhibited transmits and motion inhibited setpoint activation will be delayed until motion ceases. |
| **GROSS** | Displayed value represents the current gross weight. |
| **NET** | Displayed value represents the current net weight. |
| **QTY** | Displayed value represents the current piece quantity (Count) |
| **lb** | The displayed value is represented in pounds. |
| **kg** | The displayed value is represented in kilograms. |
| **Oz, lb oz, g** | The displayed value is represented in either ounces, pound ounces or grams. |
| **Lo** | Illuminates when the battery reaches a low tolerance. LCD only |

## 1.10 Remote Display

The remote display function allows a master indicator (Model 350 or Model 355) to be echoed to another indicator (350 Series or 60 Series) and be used in a remote location. There are certain parameters that must be set in order to have the master and slave indicators communicate together. If the remote display mode is enabled, r-dsp will be shown on the display. See page 96 for further instructions.

## 1.11 FCC and EMC declarations of compliance

### United States

**Table 1.2**

| |
|---|
| This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense. |

### Canada

**Table 1.3**

| |
|---|
| This digital apparatus does not exceed the Class A limits for radio noise emissions from digital apparatus set out in the Radio Interference Regulations of the Canadian Department of Communications. |
| Le présent appareil numérique n'émet pas de bruits radioélectriques dépassant les limites applicables aux appareils numériques de la Classe A prescrites dans le Règlement sur le brouillage radioélectrique edicté par le ministère des Communications du Canada. |

### European Countries

**Table 1.4**

| |
|---|
| **WARNING:** This is a Class A product. In a domestic environment, this product may cause radio interference in which the user may be required to take adequate measures. |

# 2 Indicator Installation

This chapter contains information necessary for proper installation of the Model 350 and Model 355. Please review these instructions before installing the indicator.

For information on installing options, see chapter 3, *Option Installation*. For NTEP and OIML details, see chapter 7, *Legal for Trade*.

***HIGH VOLTAGES MAY EXIST WITHIN THE ENCLOSURE. TO PREVENT THE RISK OF ELECTRICAL SHOCK, ALWAYS UNPLUG THE MODEL 350/355 WHEN OPENING THE ENCLOSURE. INSTALLATION AND SERVICING OF THE MODEL 350/355 SHOULD BE PERFORMED ONLY BY AUTHORIZED AND QUALIFIED SERVICE PERSONNEL.***

***IMPORTANT! The 350 Series indicators do not include an on/off switch and therefore must be installed near a power outlet socket that is easily accessible and in keeping with UL/CSA Safety Standards.***

***INFORMATION IMPORTANT! Prendre note que les contrôleurs de serie 350 ne sont pas munis d'interrupteurs "Marche / Arrêt". Par conséquent, il devront être installés près d'une source d'alimentation secteur accessible pour demeurer sous les exigences des normes de sécurité UL/CSA.***

## 2.1 Mounting

The standard Model 350 zinc die cast enclosure is a NEMA1 (IP 20) equivalent. The Model 350/355 stainless steel enclosure meets NEMA 4X type specifications.

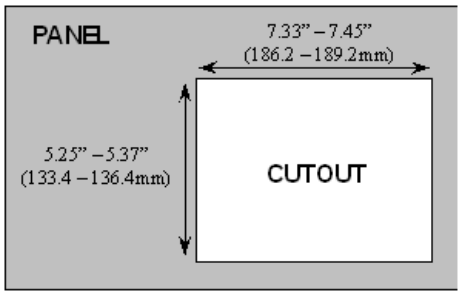
When choosing a mounting location for the Model 350 die cast, ensure that the unit is not installed in a washdown area or conductive dust environment.

### 2.1.1 Desktop Mounting

The stainless steel enclosure is designed for desktop mounting. The 350 die cast may be installed as a desktop unit with the optional mounting bracket 24350B-301C0 (refer to Figure 2.1 for installation details). When set on a flat surface, the front face is angled for easy viewing. All wiring enters from the rear and can be secured with the included screw mounted cable ties.

## 2.1.2 Panel Mounting (die cast only)

The optional panel mount kit allows for the zinc die cast enclosure to be installed in a user panel. The panel mount kit is only available in die cast not in stainless steel. Allow for 2.00" (57.2mm) depth behind the panel surface. See Panel Mount Kit on page 31 for more details.




## 2.1.3 Permanent and Table Top Mounting

### Die Cast Model 350

The optional mounting bracket allows the zinc die cast enclosure to be securely fastened to another surface. The bracket is attached to the indicator with two thumbscrews and can be swiveled to an optimal viewing angle.

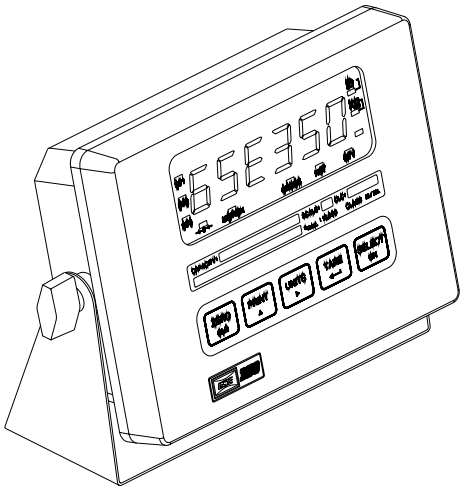


**Figure 2.1 Model 350 Zinc Die Cast with Optional Mounting Bracket**

### Stainless Steel Model 350 and 355

The mounting bracket comes standard on the stainless steel models.

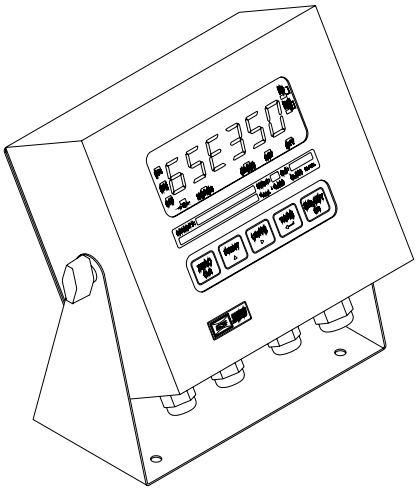


**Figure 2.2 Model 350 and 355 Stainless Steel Mounting Bracket**

#### *Table-top use*

For tabletop use, position the indicator for convenient viewing. A swivel bracket with non-slip rubber feet enables tilting of the indicator face to any viewing angle without the controller sliding when keys are pressed.

#### *Permanent mounting*

The swivel bracket has four holes for mounting to a fixed surface. The holes are 0.7 mm (0.28 in) diameter to accommodate M6 metric or ¼ in fasteners.

## 2.2 Outline Drawings

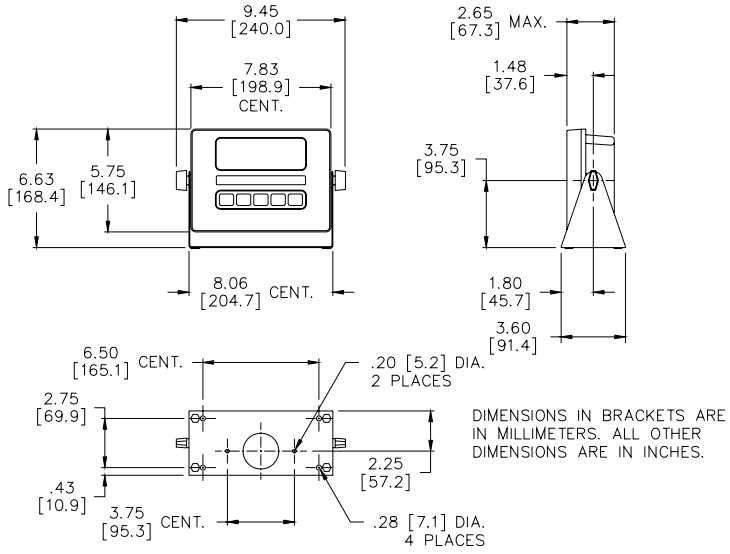



**Figure 2.3 Model 350 Zinc Die Cast Dimensions**

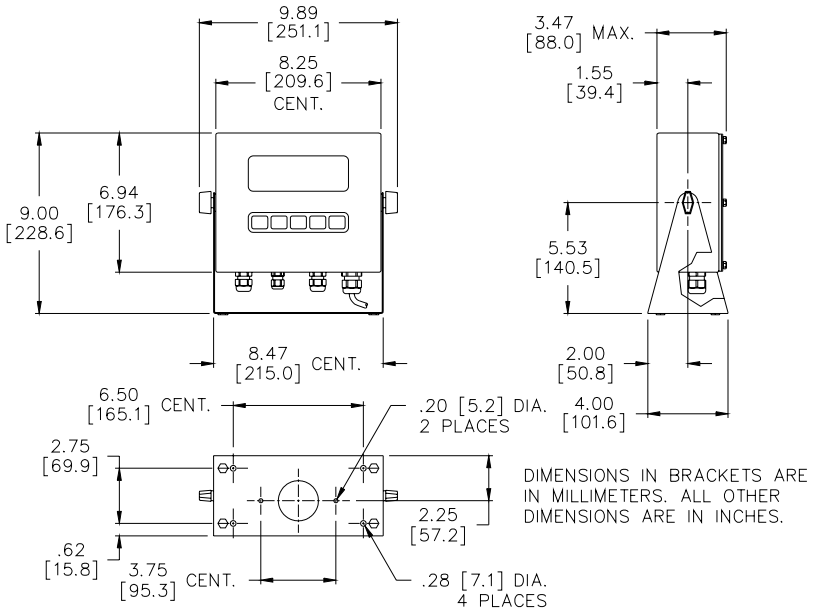



**Figure 2.4 Model 350 Stainless Steel Dimensions**

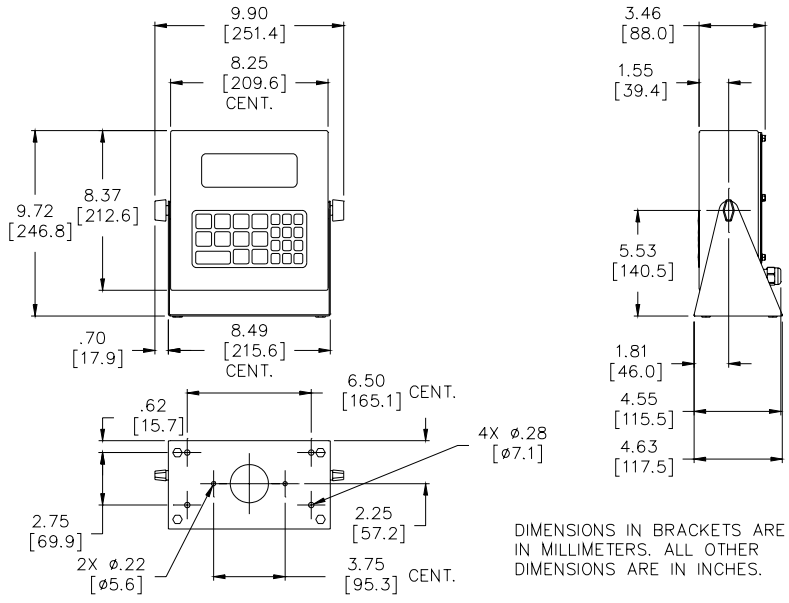



**Figure 2.5 Model 355 Stainless Steel Dimensions**

## 2.3 Wiring

Wiring a load cell or communication port is simple on both the die cast and stainless steel models. Refer to the information in this section for more details.

### 2.3.1 Stainless Steel Model 350/355

The stainless steel models must be wired through the strain reliefs located on the bottom or rear of the enclosure and connected to the main board. Refer to Figure 2.6 and Figure 2.7.

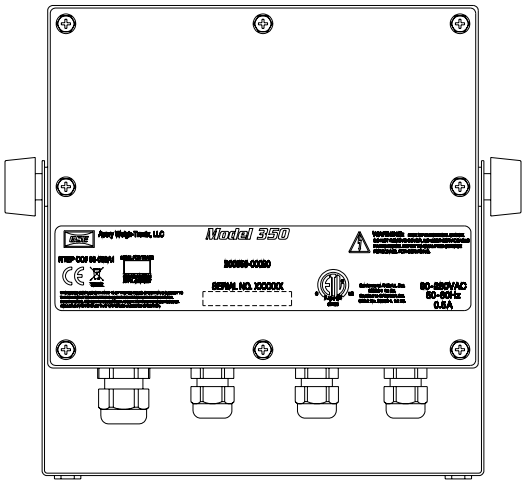



**Figure 2.6 Model 350 Stainless Steel Rear Panel**

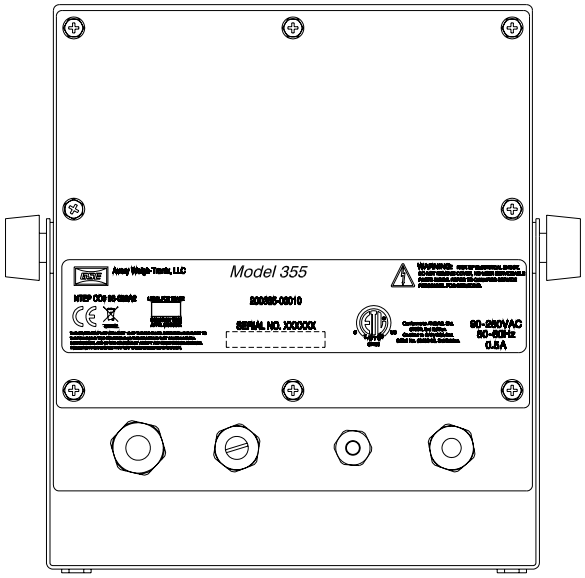



**Figure 2.7 Model 355 Stainless Steel Rear Panel**

### 2.3.2 Die Cast Model 350

A description of all wiring terminals is included on the bottom label of the zinc die cast enclosure as shown in Figure 2.8.

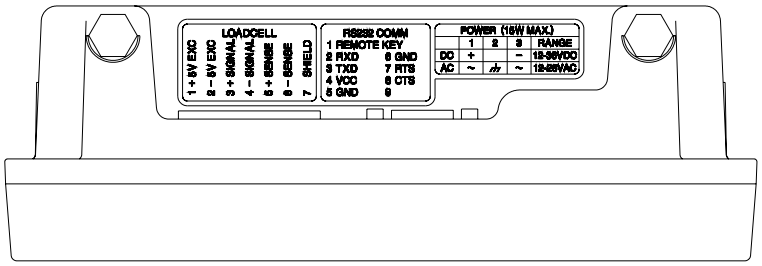



**Figure 2.8 Model 350 Zinc Die Cast Enclosure Wiring Label**

## 2.4 Load Cell Connections

A high quality braided shield cable with 16 to 24 AWG stranded wire is recommended for load cell or summing box connections. Secure the cable by the cable tie on the die cast model, or route it through the strain relief supplied on the back of the internal power supply models (see Figure 2.9). Either four or six conductor cables can be used.

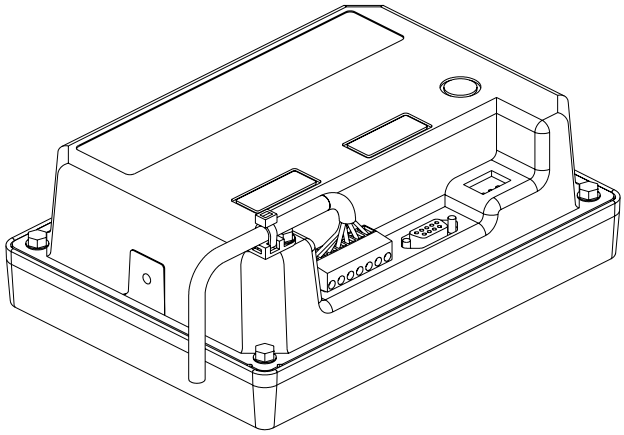


**Figure 2.9 Model 350 Cable Tie on Die Cast**

*Do not tin the ends of the load cell wire! A terminal connection free from the effects of vibration and oxidation can be assured only if the load cell terminals securely grip a bare, stranded wire.*

When using four conductor cables, (+ Excitation) must be connected together with (+ Sense), and (- Excitation) must be connected together with (- Sense) on the Model 350 die cast. .

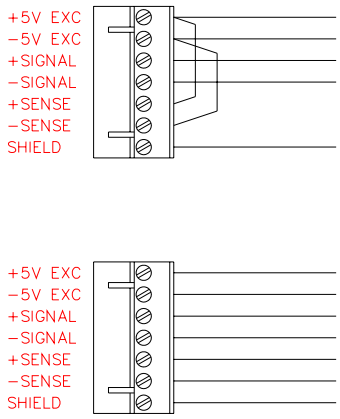



**Figure 2.10 Model 350 Die Cast Load Cell Connection (J8)**

Sense jumpers are standard on the Model 350/355 Stainless Steel (E3 and E4). Utilizing the (+) and (-) Sense leads of six conductor cables provides compensation for variations in the excitation voltage due to resistance changes in the cable

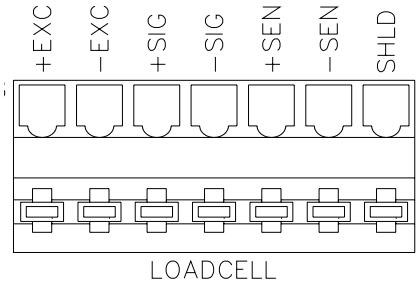


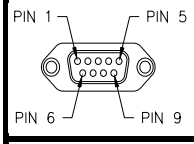
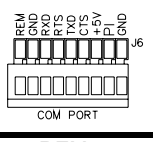

**Figure 2.11 Model 350/355 Stainless Steel Load Cell Connector (J10)**

## 2.5 Serial Port Connections

Before connecting to the serial port, consideration should be given to the communication protocol and to any remote key requirements. For information on remote key operation, refer to Remote Key Operation on page 94. Use Table 2.1 Serial Port Connections to determine proper wiring to the communication port.

Communication connections are made through the DB9 male connector on the rear of the enclosure or a pigtailed cable through a strain relief (internal power supply model on J6 comm connector). The cable should be 20 to 28 AWG with a braided or foil shield for either model type. For maximum noise immunity on the die cast model, use a mating DB9 connector with a metal hood and a braided shield cable. Ensure that the braid makes good connection with the hood. The maximum recommended cable length is 50 feet (15 meters). However, much longer connections are possible if using a properly shielded, low-capacitance cable.

**Table 2.1 Serial Port Connections**

|  |  | Description | Label (Die cast encl. only) |
|---|---|---|---|
| 1 | REM | Remote Key | REMOTE KEY |
| 2 | RXD | Receive | RXD |
| 3 | TXD | Transmit | TXD |
| 4 | +5V | +5 VDC | VCC |
| 5 | GND | Digital Ground | GND |
| 6 | GND | Digital Ground | GND |
| 7 | RTS | Request-to-Send | RTS |
| 8 | CTS | Clear-to-Send | CTS |
| 9 | I/O | Do Not Connect | |

## 2.6 Remote Key Connection

A remote key may be connected to the Model 350/355 communication port to provide remote activation of print, tare, or zero functions.

The connection for the remote key input is between pin 1 and pin 6 of the DB9 communication port connector (see Figure 2.13 for die cast, Figure 2.12 for stainless). A two-conductor shielded cable between 28 and 20 AWG is recommended. The input requires a contact closure from a push-button switch, a 'dry' relay contact, a photo-eye, and a proximity sensor or other such device. A closure initiates the operation specified at P800.

***Do not apply an external voltage to remote key terminals! Only a contact closure is required to activate the remote key input.***

The open circuit voltage across the remote key pins is +5 VDC. A closed switch will conduct about 0.25 mA. Therefore, a low-voltage switch with gold-plated contacts is recommended. A Mercury-wetted switch will also work well. A minimum contact duration of 100 ms is required. Once invoked, the selected remote key operation will not repeat until the contact is released and closed again.

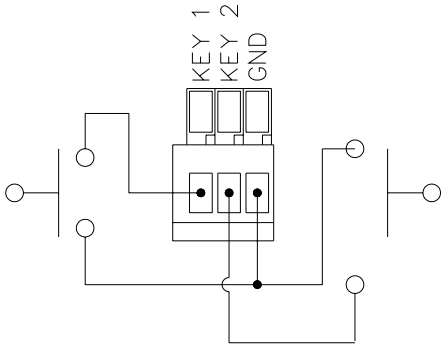



**Figure 2.12 Remote Key Connection (Model 350 and 355 Stainless Steel)**

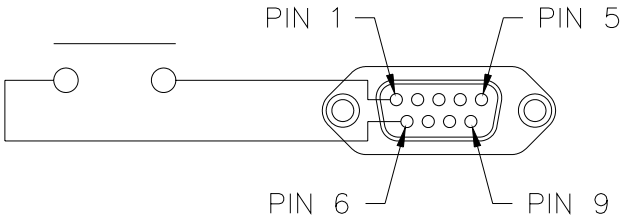



**Figure 2.13 Remote Key Connection (Model 350 Die Cast)**

## 2.7 Remote Display Connections

It is possible to connect one Model 350/355 indicator to another Model 350/355 and have the remote indicator display a copy of the master indicator or customize the display of the remote (slave) indicator. The keypad on both the master and slave indicators will operate. Refer to the drawing below to connect the master indicator to the remote (slave) indicator. Refer to page 96 to configure the master and remote (slave) displays. There are several different configurations for Master to remote (slave) indicator connection and setup.

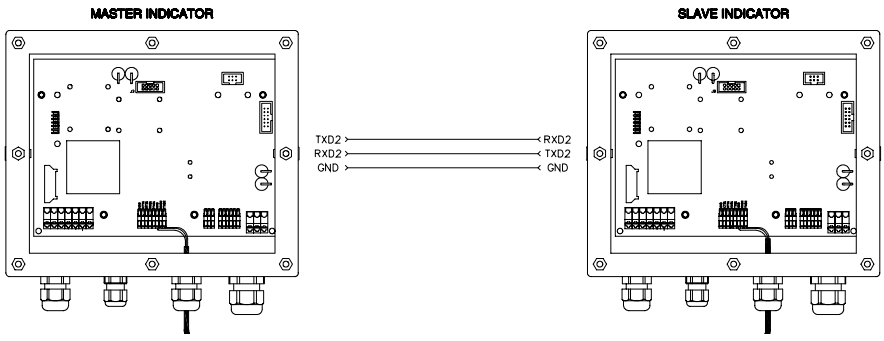



**Figure 2.14 Master Indicator to Remote (slave) Indicator Connections**

## 2.8 Power Connection

There are four ways to power the Model 350/355.

- 120 VAC wall mount transformer
- 12-36 VDC external source
- 12-26VAC external source
- Internal battery option

*The Model 350/355 does not include an on/off switch. In keeping with UL/CSA Safety Standards it must be installed near an easily accessible power outlet. Note that the [ON] key does not connect/disconnect the line voltage. It 'awakens' the Model 350/355 from a 'sleep' mode.*

### 2.8.1 120VAC Wall Mount Transformer (die cast 350)

An external wall mount transformer is supplied with the die cast Model 350 for connection to 120VAC, 60Hz power and is plugged into J4 of the 350 die cast main board.

***DO NOT CUT THE GROUND PRONG OFF THE WALL MOUNT TRANSFORMER!***

**To connect the transformer:**

1. Insert the polarized plug into the rectangular power connector (J4).
2. Press the plug firmly into the hole to ensure it is seated properly.
3. Plug the wall mount transformer into a nearby wall outlet. Use only a three-wire grounded outlet.

### 2.8.2 External AC or DC Power Supply (die cast 350)

The Model 350 die cast may be powered by an external 12-36 VDC or 12-26 VAC power source. The power supply should have a minimum current rating of 800mA with no options installed, a minimum current rating of 1.25A with options installed. Recommended plugs are AMP MTA .156" or MOLEX .156".

External DC power supply cable GSE P/N 22-30-35459 plugs into the Model 350 die cast unit rear connector with bare wires on the other end.

An internal option battery module is available, GSE part number 24350B-120B1. Refer to page 52 for details on installation.

| | Pin 1 | Pin 2 | Pin 3 | Range |
|---|---|---|---|---|
| DC | + | N/C | - | 12-36 VDC |
| AC | L | GND | N | 12-26 VAC 50/60 HZ |

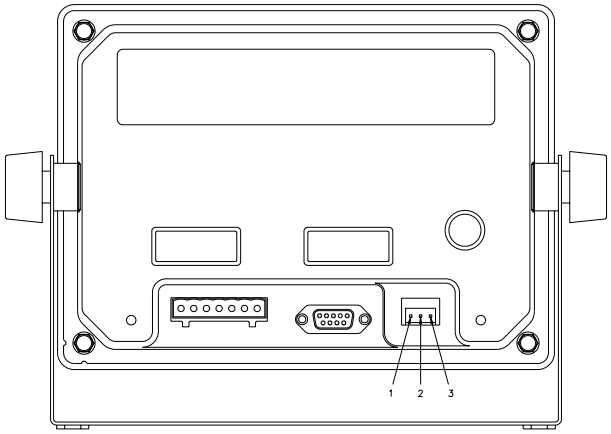



**Figure 2.15 Model 350 Die Cast Power Connections**

## 2.8.3 Internal AC or DC Power Supply (stainless steel 350/355)

### AC Power Supply

The Model 350/355 internal power supply model (stainless steel) may be powered by an external VAC power source connected to (J14) on the main board. Input power can be 85 - 265VAC, 0.5A; 50/60 Hz. See the internal AC power connector as shown in Figure 2.16. The ground wire is connected to a stud on the enclosure.

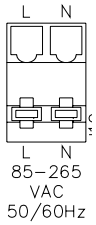



**Figure 2.16 Model 350/355 Internal Power Supply AC Connection (J14)**

## DC Power Supply

The Model 350/355 internal power supply model may be powered by an external 10-36 VDC power source connected to (J12) on the main board (also see Battery Power Supply on page 52). The power supply should have a minimum current rating of 800mA with no options installed, a minimum current rating of 1.25A with options installed.

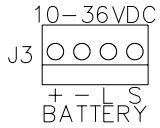



**Figure 2.17 Model 350/355 Internal Power Supply DC Connection (J12)**

| | Pin 1 | Pin 2 | Pin 3 | Pin 4 | Range |
|---|---|---|---|---|---|
| DC | + | - | Low Batt | Shut Down | 12-36 VDC |

Do not connect pins 3 or 4. The mating connector can be purchased from a local electronics supplier. Recommended connectors are GSE PN: 26-20-3365 (24 AWG) or GSE PN: 26-20-3366 (22 AWG) / AMP PN: 640441-3 (24 AWG) or AMP PN: 640440-3 (22 AWG). Connector cover GSE PN: 26-20-3389 or AMP PN: 643075-3.

# 3 Option Installation

The capabilities of the Model 350 can be expanded with the use of one or more option kits. This chapter provides installation procedures for these options.

## 3.1 Model 350/355 Options

The following options are available for the Model 350:

- Swivel Bracket Kit (die cast model) (GSE P/N 24350B-301C0)
  - Allows the indicator to be securely mounted to any surface.
- Panel Mount Kit (die cast model) (GSE P/N 24350B-300C0)
  - Allows the indicator to be easily mounted into existing cabinetry.
- 2 - Option Mounting Bracket (GSE P/N 24350B-302C0)
  - Provides for mounting up to two option boards (required for the stainless steel enclosure only).
- Analog Output Module (GSE P/N 24350B-203B0)
  - Provides an electrically isolated, 16-bit analog signal for connectivity to external devices.
- Setpoint Control Module (GSE P/N 24350B-100C1) and (GSE P/N 24350B-100C2)
  - Provides three discrete outputs for direct control of operation equipment.
- Battery Power Supply (die cast) (GSE P/N 24350B-120B1) and (stainless steel) (GSE P/N 24350B-121B1)
  - Provides portability for the Model 350/355.
- 20 mA Current Loop (GSE P/N 24660B-404A0)
  - Provides a digital 20 mA current loop.
- RS-485 Network (stainless steel model) (GSE P/N 24660B-401A0)
  - Allows the indicator to communicate with hazardous area indicator via fiber-optic cable.

## 3.2 Swivel Bracket

The Model 350 die cast has an optional stainless steel swivel bracket for secure mounting to desks, tabletops or walls. See the Mounting section beginning on page 17 for instructions on mounting the Model 350/355 using the swivel bracket.

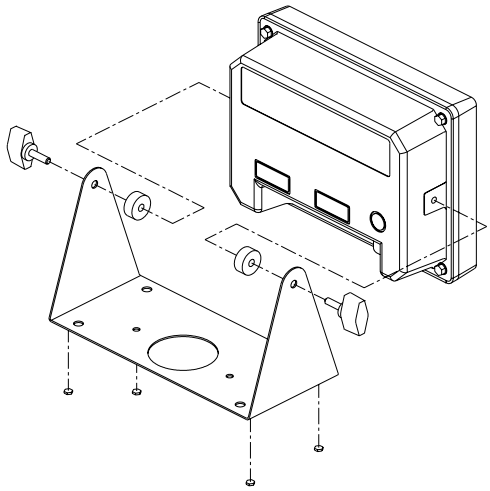


**Figure 3.1 Swivel Bracket Installation (die cast model)**

### 3.2.1 Install the swivel bracket:

1. Unpack the Swivel Bracket option.

1a. Be sure that all parts shown in Figure 3.1 are accounted for.

2. Remove the two plastic Heyco plugs.

2a. The plugs are located in the threaded bracket mounting holes on either side of the indicator. Be careful not to scratch the finish of the indicator when removing these plugs.

3. Place the two spacers against the bracket and then insert the thumb screws.

3a. The spacer and bracket holes should align with the bracket mounting holes on either side of the enclosure.

## 3.3 Panel Mount Kit

The Panel Mount Kit provides an easy way to mount the indicator into new or existing cabinetry. See Figure 3.2 for detailed instructions on panel mounting the Model 350 die cast. See also NTEP Panel Mount Requirements on page 144 for additional panel mounting NTEP requirements.

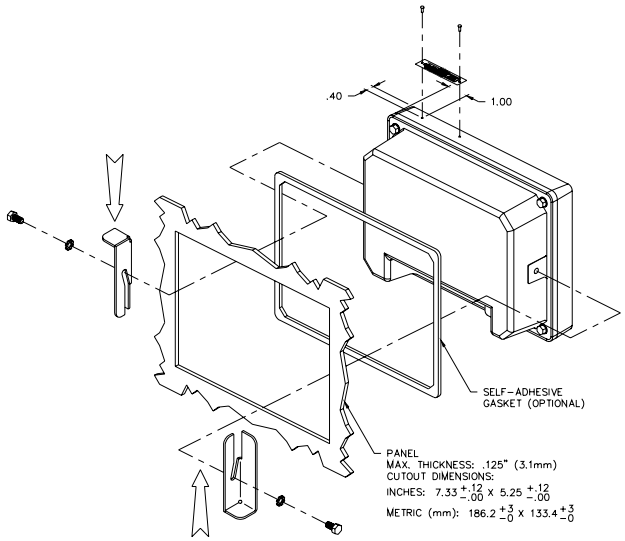



**Figure 3.2 Model 350 Panel Mount Installation (die cast model only)**

### 3.3.1 Install the Model 350 Panel Mount Kit:

1. Unpack the Panel Mount Kit.

1a. Be sure that all parts shown in Figure 3.2 are accounted for.

2. Remove the two plastic Heyco plugs.

2a. The plugs are located in the threaded bracket mounting holes on either side of the indicator. Be careful not to scratch the finish of the indicator when removing these plugs.

3. Place the adhesive gasket around the panel cutout.

3a. This step is optional. The gasket should be adhered onto the outside of the panel and centered around the cutout.

4. Place the Model 350 through the panel cutout.

4a. This step may require a second person to hold the indicator in place. The indicator should be centered inside the cutout.

5. Using two small screws and star washers, attach the two panel mount brackets. The center holes of the brackets should align with the threaded bracket mounting holes on either side of the indicator. The two brackets should angle away from the indicator. Apply pressure on the mounting brackets in the directions shown in Figure 3.2. This will ensure the indicator is drawn firmly against the panel.

6. Using four long screws and four lock-nuts, secure the indicator to the panel. Thread the lock-nuts onto the screws so that they will not interfere with tightening the screws into the threaded bracket holes. Evenly tighten the four screws until they are snug. Do not over-tighten. Now thread the lock-nuts down until they are snug against the bracket.
7. Drill 1/16 (0.0625) diameter pilot hole on the front of the enclosure for the serial number label.
8. Add the serial number to the label.
9. Install the label by tapping the pins through the label into the front enclosure.

## 3.4 Analog Card Connections

The 16-bit electrically-isolated analog output module provides a highly accurate analog signal, proportional to weight. This signal can be used for interfacing to PLCs, chart recorders, and other such devices.

See Analog Output Setup on page 131 for analog output software configuration details.

***The Model 350/355 contains components which could be damaged by Electrostatic Discharge (ESD) if serviced improperly. Use proper ESD precautions (wear a wrist strap connected to ground, use grounded work stations, etc.) when opening the enclosure.***

***Never connect or disconnect option board cables while the indicator is powered. Doing so may result in circuit board damage.***

***HIGH VOLTAGES MAY EXIST WITHIN THE ENCLOSURE! TO PREVENT THE RISK OF ELECTRICAL SHOCK, ALWAYS UNPLUG THE MODEL 350/355 WHEN OPENING THE ENCLOSURE. INSTALLATION AND SERVICING OF THE MODEL 350/355 SHOULD BE PERFORMED BY AUTHORIZED AND QUALIFIED SERVICE PERSONNEL ONLY.***

### 3.4.1 Install the Analog Output Module

**350 die cast model**

1. Open the indicator. Remove the four screws from the back of the unit. It may help to remove the swivel bracket, if installed.
2. Place the back of the indicator, open side down, on a firm surface. Using a hammer and screwdriver, remove the appropriate knock-out.

2a. It helps to place the screwdriver tip on the knockout pad, rather than in the groove. The knock-outs do not require much force to remove. If only installing one option, the left knock-out (as viewed from the rear) should be removed. A small file may be used to remove any burrs.

3. Flip the back cover over and place the Analog Output Module, component side down, over the four mounting holes. Install four 10mm screws to a minimum of 8 in/lb of torque.

3a. Be sure the cable is already attached before installing the card. Also, be sure the cable is attached to the left-most connector (as viewed from the component side of the option board). The second connector is for 'daisy-chaining' another option card. The screws used to mount the option card are self-tapping and will require added torque when first installed.

4. Attach the loose end of the cable to the serial I/O connector (J7) on the main board or the open connector of a previously installed option card.

4a. J7 is a 10-pin polarized connector. Be sure the cable is not twisted when installed. If this is a second option card, route the cable to the open connector of the first option card.

5. Reinstall the back cover. Tighten the four screws to a minimum of 8 in/lb torque.

5a. Be sure to avoid 'pinching' the cable between the housing halves. Affix all appropriate labels to the back of the indicator.

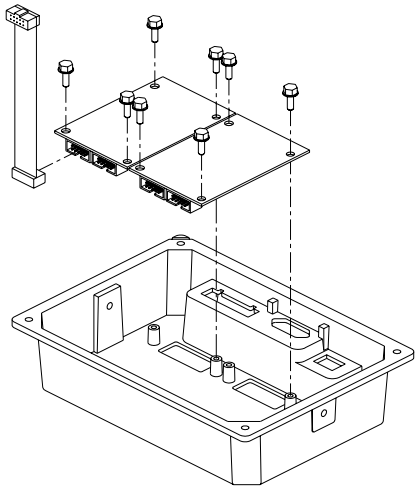


**Figure 3.3 Option Board Installation (Die Cast Model 350)**

## 3.4.2 Install the Analog Output Module without mounting bracket

### Model 350/355 Stainless

If only one option is being installed in a fiber-optic hub indicator use the following instructions. If two options are being installed along with a fiber-optic option an option mounting plate is required. Refer to page 57 for installation instructions.

1. Open the indicator. Remove the eight screws from the back of the unit.

2. Locate the option mounting holes by lining up the option card with the four holes to the left of the power supply section on the main board.

2a. This is where the first option card should be installed.

3. Install (4) nylon standoffs supplied with the option kit into the thru-holes on the main board. See Figure 3.4.

4. Place the option card on the (4) nylon standoffs installed in step 3.

5. Fasten the option card to the standoffs with the (4) nylon nuts supplied with the option kit.

6. Tighten the stand-offs gently with a 8 mm hex nut driver.

6a. If this is the only option card being installed, attach the loose end of the cable on the option card to the serial I/O connector (J3) on the main board. J3 is a 10-pin polarized connector. Skip to step 7.

or

6b. If a second option is being installed, locate the option mounting holes surrounding the A/D can on the main board. Follow steps 4 - 6 to install the second option card.

6c. Connect the loose end of the cable of the second option card to (J3) of the main board. Connect the loose end of the cable of the first option card to J1 of the second option card.

7. Route the cables being connected to the option cards through the available strain-relief(s). Make sure to connect cable conductors to the proper terminals before closing the unit.

8. Reinstall the back cover. Tighten the eight screws securely to create a good seal. Be sure to avoid 'pinching' the cable between the housing halves.

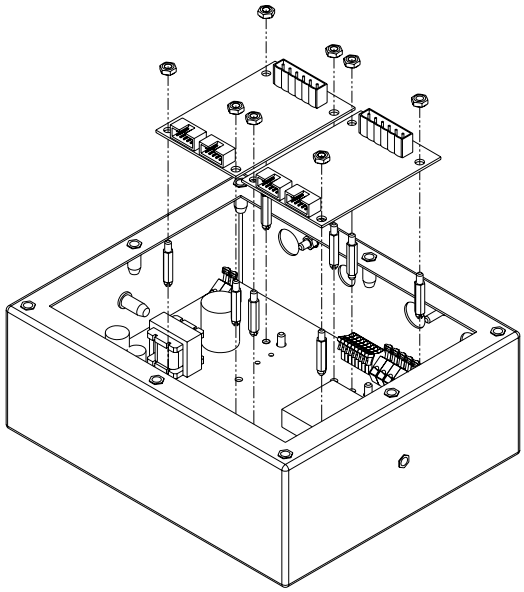


**Figure 3.4 Option Board Installation Flash Version**

## 3.4.3 Install the Analog Output Model with Option Mounting Bracket

### Model 350/355 Stainless

1. Open the indicator. Remove the eight screws from the back of the unit.

2. Locate the three studs and one thru-hole on the 350 main board that the option mounting bracket will be attached to. See Figure 3.5. Remove the nuts from the three studs on the main board.

2a. It may help to position the option mounting bracket over the 350 main board to locate the three studs and one thru-hole.

3. Install the nylon stand-off supplied with the option bracket kit into the thru-hole on the option bracket. See Figure 3.5.

3a. The thru-hole is located on the option bracket, towards the center of the board, on the irregular flanged section (a smaller hole than the others on the bracket) that would be positioned towards the power supply regulator (U11) with a flanged heat sink on it.

4. Install the three hex stand-offs onto the studs on the main board.

5. Tighten the stand-offs gently with a 6 mm hex nut driver.

5a. If the option card is being installed in a Model 355, unplug the keypad cable from the serial I/O connector (J17) on the main board and plug the cable into the option connector of the option card (J1). Plug the cable from J3 of the option card to J17 of the main board.

or

5b. If this is the first option card, attach the loose end of the cable to the serial I/O connector (J7) on the main board. Let the card gently hang over to the outside of the enclosure until mounting. J7 is a 10-pin polarized connector.

6. This step is not necessary if this is the second card installed.

6a. Position the nylon stand-off (attached to the bracket) into the hole on the main board while routing the threads of the other hex stand-offs thru the holes on the bracket, while pressing down over the nylon stand-off until it snaps into place.

6b. Line-up the three other hex stand-offs into the bracket thru-holes first before securing the nylon stand-off into the main board thru-hole.

7. Secure the bracket into position with the hex nuts supplied with the kit. Do not over tighten.

8. Place one set (four pieces) of the nylon sleeve type stand-offs onto the four studs of the option bracket. Place the Analog Output Module, component side up, onto the nylon sleeve stand-offs. Install four hex nuts and secure gently.

8a. Select the four studs closest to the (J7) connector of the main board to add the four sleeve stand-offs. Be sure the cable is already attached to (J7) on the main board before installing the card. Also be sure the cable is attached to the right-most connector (J3) (as viewed from the component side of the option board). The second connector (J1) is for 'daisy-chaining' another option card. The additional mounting hardware is supplied with the option bracket kit. This hardware should be saved for future use if not being used.

9. Route the analog cable through the available strain-relief.

9a. Make sure to connect cable conductors to the proper terminals before closing the unit.

10. Reinstall the back cover. Tighten the eight screws securely to create a good seal.

10a. Be sure to avoid 'pinching' the cable between the housing halves.

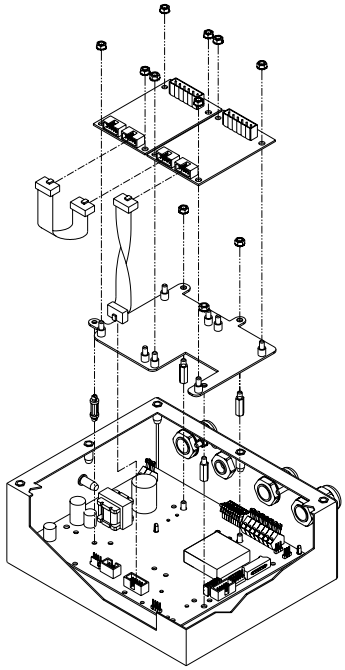


**Figure 3.5 Option Board Installation with Option Plate (Stainless 350/355)**

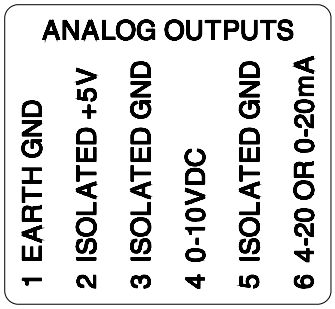
## 3.4.4 Analog Connections

**Table 3.1 Analog Output Connections**

| Pin | Connection Name | Description |
|---|---|---|
| 1 | Earth Ground | Non-isolated earth ground (future use). |
| 2 | + 5 VDC | Isolated 5 volt source (future use). |
| 3 | Isolated Ground | Provides an isolated ground connection. |
| 4 | Vout | Used for the 0-10 VDC analog signal output. |
| 5 | Isolated Ground | Provides an isolated ground connection. |
| 6 | Iout | Used for 4-20 or 0-20 mA analog signal output. |

### 350 Die Cast

Place this label on the rear of the indicator above the analog option knockout. Wire the option connector in accordance with the label (left to right).




### 350/355 Stainless Steel

Cut off the text "ANALOG OUTPUTS" from the label and place it on the connector shown below (apply to the area just under the field external wire terminals).

## 3.4.5 Analog Board Diagnostic and Test Procedures

The following test procedures affect the analog output signal levels. Be sure to disconnect all peripheral devices attached to the analog option card.

*Test equipment needed: precision DC voltmeter, 500 ohm precision resistor. The 500 ohm resistor must meet the following specifications: .01% tolerance and 5ppm temperature coefficient.*

*This test procedure requires that the initial analog option calibration procedure has been completed*

### Test the 0-10V output mode

1. Enter the Setup Mode (see Setup Mode on page 61).

   Chngs Poss!

   P110.-- ~ F.S.= ~ 100.00

2. Attach the voltmeter + (red) lead to pin 3 (0-10VDC) and the - (black) lead to pin 2 (ISOLATED GND) of the Analog Output connector.

3. Key in 62002 [SELECT].

   Test ~ 0-10v

   Per P176

4. Press [TARE] or [ENTER] to set the output to 0%.

   0-10v ~ 0P

   0.00 VDC

5. Press [TARE] or [ENTER] to increase the output to 25%.

   0-10v ~ 25P

   2.50 VDC

6. Press [TARE] or [ENTER] to increase the output to 50%.

   0-10v ~ 50P

   5.00 VDC

7. Press [TARE] or [ENTER] to increase the output to 75%.

   0-10v ~ 75P

   7.50 VDC

8. Press [TARE] or [ENTER] to increase the output to 100%.

   0-10v ~ 100P

   1.00 VDC

### Test the 0-20mA output mode:

Voltmeter readings are based on the use of a 500 ohm precision resistor. Caution! Do not exceed 500 ohms.

1. Enter the Setup Mode (see Setup Mode on page 61).

   Chngs Poss!

   P110.-- ~ F.S.= ~ 100.00

2. Attach the precision resistor to pin 5 and pin 6.
3. Attach the voltmeter + (red) lead to pin 6 (0-20 mA) of the analog output connector.
4. Attach the voltmeter - (black) lead to pin 5 (ISOLATED GND) of the Analog Output connector.
5. Key in 62003 [SELECT]

   Test ~ 0-20A

   Per P176

6. Press [TARE] or [ENTER] to set the output to 0%.

   0-20A ~ 0P

   0.00 V

7. Press [TARE] or [ENTER] to increase the output to 25%.

   0-20A ~ 25P

   2.5 V

8. Press [TARE] or [ENTER] to increase the output to 50%.

   0-20A ~ 50P

   5 V

9. Press [TARE] or [ENTER] to increase the output to 75%.

   0-20A ~ 75P

   7.5 V

10. Press [TARE] or [ENTER] to increase the output to 100%.

    0-20A ~ 100P

    10 V

### Test the 4-20mA output mode:

Voltmeter readings are based on the use of a 500 ohm precision resistor.

Caution! Do not exceed 500 ohms.

1. Enter the Setup Mode (see Setup Mode on page 61).

   Chngs Poss!

   P110.-- ~ F.S.= ~ 100.00

2. Attach the precision resistor to pin 5 and pin 6.
3. Attach the voltmeter + (red) lead to pin 6 (4-20 mA) of the analog output connector.
4. Attach the voltmeter - (black) lead to pin 5 (ISOLATED GND) of the Analog Output connector.
5. Key in 62004 [SELECT]

   Test ~ 4-20A

   Per P176

6. Press [TARE] or [ENTER] to set the output to 0%.

   4-20A ~ 0P

   2 V

7. Press [TARE] or [ENTER] to increase the output to 25%.

   4-20A ~ 25P

   4 V

8. Press [TARE] or [ENTER] to increase the output to 50%.

   4-20A ~ 50P

   6 V

9. Press [TARE] or [ENTER] to increase the output to 75%.

   4-20A ~ 75P

   8 V

10. Press [TARE] or [ENTER] to increase the output to 100%.

    4-20A ~ 100P

    10V

## 3.5 Setpoint Card Connections

Using one of the software setpoint configurations in conjunction with the setpoint option board gives the Model 350/355 the ability to directly control external devices such as valves, relays, actuators, etc.

There are up to three setpoint outputs available. The activation and deactivation is controlled by the setpoint configuration. The outputs are capable of driving up to 20-280VAC & 2 Amp at 3-60VDC @ 1A. The solid state relays are normally open (NO) contacts.

The Model 350/355 contains components which could be damaged by Electrostatic Discharge (ESD) if serviced improperly. Use proper ESD precautions (wear a wrist strap connected to ground, use grounded work stations, etc.) when opening the enclosure.

High voltages may exist within the enclosure! To prevent the risk of electrical shock, ALWAYS unplug the Model 350/355 when opening the enclosure. Installation and servicing of the Model 350/355 should be performed by authorized and qualified service personnel only.

Never connect or disconnect option board cables while the indicator is powered. Doing so may result in circuit board damage.

### 3.5.1 Install the Setpoint Control Module (350 die cast):

1. Open the indicator.
2. Remove the four screws from the back of the unit. It may help to remove the swivel bracket, if installed.
3. Place the back of the indicator, open side down, on a firm surface. Using a hammer and screwdriver, remove the appropriate knock-out.

3a. It helps to place the screwdriver tip on the knockout pad, rather than in the groove. The knock-outs do not require much force to remove. If only installing one option, the left knock-out (as viewed from the rear) should be removed. A small file may be used to remove any burrs.

4. Flip the back cover over and place the Setpoint Control Module, component side down, over the four mounting holes. Install four 10mm screws to a minimum of 8 in/lb of torque.

4a. Be sure the cable is already attached before installing the card. Also be sure the cable is attached to the left-most connector (as viewed from the component side of the option board). The second connector is for 'daisy-chaining' another option card. The screws used to mount the option card are self-tapping and will require added torque when first installed.

5. Attach the loose end of the cable to the serial I/O connector (J7) on the main board or the open connector of a previously installed option card.

5a. J7 is a 10-pin polarized connector. Be sure the cable is not twisted when installed. If this is a second option card, route the cable to the open connector of the first option card.

6. Reinstall the back cover. Tighten the four screws to a minimum of 8 in/lb torque.

6a. Be sure to avoid 'pinching' the cable between the housing halves. Affix all appropriate labels to the back of the indicator.

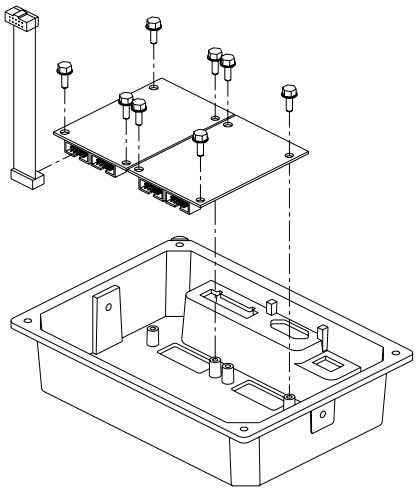


**Figure 3.6 Option Board Installation (Die Cast Model 350)**

## 3.5.2 Install the Setpoint Module without mounting bracket (Stainless):

If only one option is being installed in a fiber-optic hub indicator use the following instructions. If two options are being installed along with a fiber-optic option an option mounting plate is required. Refer to page 57 for installation instructions.

1. Open the indicator. Remove the eight screws from the back of the unit.
2. Locate the option mounting holes by lining up the option card with the four holes to the left of the power supply section on the main board.

2a. This is where the first option card should be installed.

3. Install (4) nylon standoffs supplied with the option kit into the thru-holes on the main board. See Figure 3.7.
4. Place the option card on the (4) nylon standoffs installed in step 3.
5. Fasten the option card to the standoffs with the (4) nylon nuts supplied with the option kit.
6. Tighten the stand-offs gently with a 8 mm hex nut driver.

6a. If this is the only option card being installed, attach the loose end of the cable on the option card to the serial I/O connector (J3) on the main board. J3 is a 10-pin polarized connector. Skip to step 6.

or

6b. If a second option is being installed, locate the option mounting holes surrounding the A/D can on the main board. Follow steps 4 - 6 to install the second option card.

7. Connect the loose end of the cable of the second option card to (J3) of the main board. Connect the loose end of the cable of the first option card to J1 of the second option card.

7a. Route the cables being connected to the option cards through the available strain-relief(s). Make sure to connect cable conductors to the proper terminals before closing the unit.

8. Reinstall the back cover. Tighten the eight screws securely to create a good seal. Be sure to avoid 'pinching' the cable between the housing halves.

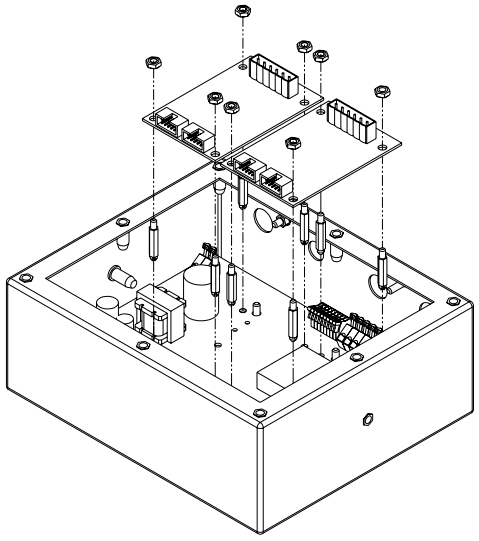


**Figure 3.7 Option Board Installation Flash Version**

## 3.5.3 Install the Setpoint Model with mounting bracket (Stainless):

1. Open the indicator. Remove the eight screws from the back of the unit.

2. Locate the three studs and one thru-hole on the main board that the option mounting bracket will be attached to. SeeFigure 3.8. Remove the nuts from the three studs on the main board.

2a. It may help to position the option mounting bracket over the 350 main board to locate the three studs and one thru-hole.

3. Install the nylon stand-off supplied with the option bracket kit into the thru-hole on the option bracket. See Figure 3.8.

3a. The thru-hole is located on the option bracket, towards the center of the board, on the irregular flanged section (a smaller hole than the others on the bracket) that would be positioned towards the power supply regulator (U11) with a flanged heat sink on it.

4. Install the three hex stand-offs onto the studs on the main board.

5. Tighten the stand-offs gently with a 6 mm hex nut driver.

5a. If the option card is being installed in a Model 355, unplug the keypad cable from the serial I/O connector (J17) on the main board and plug the cable into the option connector of the option card (J1). Plug the cable from J3 of the option card to J17 of the main board.

or

5b. If this is the first option card, attach the loose end of the cable to the serial I/O connector (J7) on the main board. Let the card gently hang over to the outside of the enclosure until mounting. J7 is a 10-pin polarized connector.

5c. This step is not necessary if this is the second card installed.

6. Position the nylon stand-off (attached to the bracket) into the hole on the main board while routing the threads of the other hex stand-offs through the holes on the bracket, while pressing down over the nylon stand-off until it snaps into place.

7. Line-up the three other hex stand-offs into the bracket thru-holes first before securing the nylon stand-off into the main board thru-hole.

7a. Secure the bracket into position with the hex nuts supplied with the kit. Do not over tighten.

8. Place one set (four pieces) of the nylon sleeve type stand-offs onto the four studs of the option bracket. Place the Setpoint Control Module, component side up, onto the nylon sleeve stand-offs. Install four hex nuts and secure gently.

9. Select the four studs closest to the (J7) connector of the main board to add the four sleeve stand-offs. Be sure the cable is already attached to (J7) on the main board before installing the card. Also be sure the cable is attached to the right-most connector (J3) (as viewed from the component side of the option board). The second connector (J1) is for 'daisy-chaining' another option card. The additional mounting hardware is supplied with the option bracket kit. This hardware should be saved for future use if not being used.

10. Route the cables being connected to the option cards through the available strain-relief(s). Make sure to connect cable conductors to the proper terminals before closing the unit.

11. Reinstall the back cover. Tighten the eight screws securely to create a good seal. Be sure to avoid 'pinching' the cable between the housing halves.

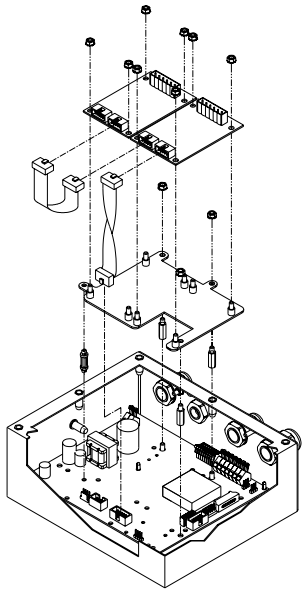


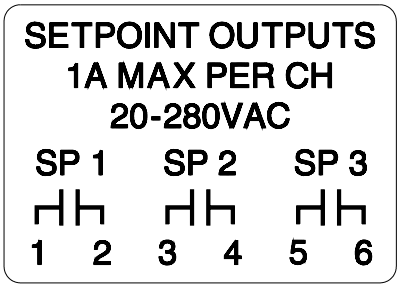
**Figure 3.8 Option Board Installation (Eprom Version)**

## 3.5.4 Setpoint Connections

| Pin | Connection Name | Description |
|---|---|---|
| 1 | Line 1 | Line voltage in for setpoint 1 |
| 2 | Load 1 | Voltage out for setpoint 1 |
| 3 | Line 2 | Line voltage in for setpoint 2 |
| 4 | Load 2 | Voltage out for setpoint 2 |
| 5 | Line 3 | Line voltage in for setpoint 3 |
| 6 | Load 3 | Voltage out for setpoint 3 |

### 350 Die Cast

Place this label above the setpoint card knockout.




### 350/355 Stainless Steel

Cut off the text "SETPOINT OUTPUTS" from the label and place it on the connector (apply to the area just under the field external wire terminals).

## 3.5.5 Setpoint Board Diagnostic and Test Procedures

This test procedure affects the setpoint output. Be sure to disconnect all peripheral devices attached to the setpoint option card.

*Test Equipment needed: Load device with power source.*

### To test the setpoint option card:

1. Enter the Setup Mode (see Setup Mode on page 61).

   Chngs Poss!

   P110.-- ~ F.S.= ~ 100.00

2. Key in 62001 [SELECT].

   Test ~ Setpt

   Load Device Inactive

3. Attach the load and power source in series with Setpoint 1 contacts.
4. Press [TARE] or [ENTER] to activate only output #1.

   Test ~ Spt 1

   Load Device Active

5. Attach the load and power source in series with Setpoint 2 contacts.
6. Press [TARE] or [ENTER] to activate only output #2.

   Test ~ Spt 2

   Load Device Active

7. Attach the load and power source in series with Setpoint 3 contacts.
8. Press [TARE] or [ENTER] to activate only output #3.

   Test ~ Spt 3

   Load Device Active

## 3.6 RS-485 Networking

The Model 350/355 indicator supports address recognition for multi-drop communications. This section describes the installation of the RS-485 network option. Firmware revision 450350-01013 or later is required for RS-485 operation. For setup and operation information, see page 75.

***The Model 350/355 contains components which could be damaged by Electrostatic Discharge (ESD) if serviced improperly. Use proper ESD precautions (wear a wrist strap connected to ground, use grounded work stations, etc.) when opening the enclosure.***

***HIGH VOLTAGES MAY EXIST WITHIN THE ENCLOSURE! TO PREVENT THE RISK OF ELECTRICAL SHOCK, ALWAYS UNPLUG THE MODEL 350/355 WHEN OPENING THE ENCLOSURE. INSTALLATION AND SERVICING OF THE MODEL 350/355 SHOULD BE PERFORMED BY AUTHORIZED AND QUALIFIED SERVICE PERSONNEL ONLY.***

***NEVER CONNECT OR DISCONNECT OPTION BOARD CABLES WHILE THE INDICATOR IS POWERED. DOING SO MAY RESULT IN CIRCUIT BOARD DAMAGE.***

### 3.6.1 Install the RS-485 Network Option (350 die cast):

1. Open the indicator. Remove the four screws from the back of the unit. It may help to remove the swivel bracket, if installed.
2. Remove the rear cover.
3. Remove the U6 IC from its socket.
4. Remove the white wire jumper.
5. Snap the plastic spacers into the three mounting holes.
6. Gently press the option board into the socket.
7. Reinstall the back cover. Tighten the screws to at least 8 in/lb torque.
8. Place the included sticker over the rear connector sticker RS232.

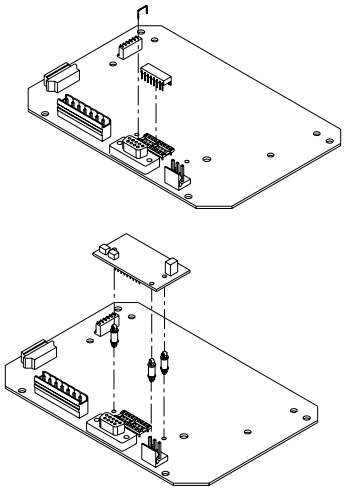


**Figure 3.9 RS-485 Installation (Die Cast 350)**

## 3.6.2 Install the RS-485 Network Options (350 Stainless and 355):

1. Open the indicator.
2. Remove the eight screws from the back of the unit and remove the cover.
3. Apply the included sticker to the J6 comm port. The label will go over the silk screen on the board.
4. Remove the U4 IC from its socket.
5. Remove the white wire jumper.
6. Snap the plastic spacers into the three mounting holes.
7. Gently press the option board into the socket.
8. Reinstall the back cover. Tighten the eight screws securely to create a good seal.

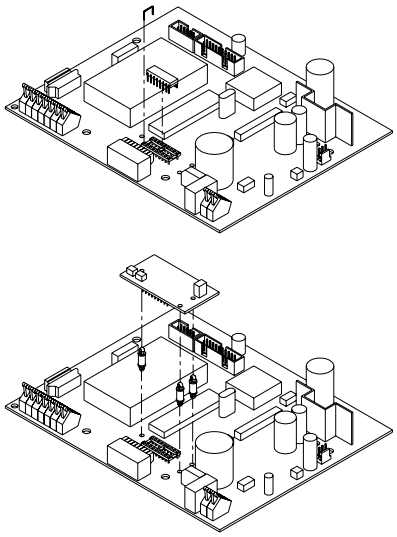


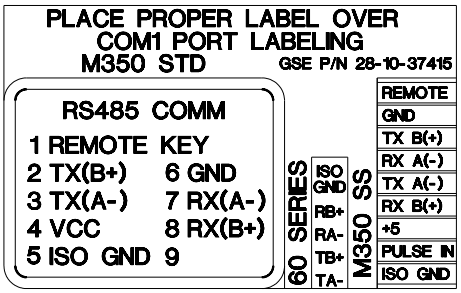
**Figure 3.10 RS-485 Installation (Stainless 350/355)**

## 3.6.3 Network Connections

Apply the supplied label over the appropriate COMM PORT pin designations.

On the stainless steel enclosure, apply the label marked Model 350/355 SS to the main board above J8. Position the label so the REM (remote) on the main board is covered with the REM (remote) of the supplied label. The new label will redefine all of the other pin designations.

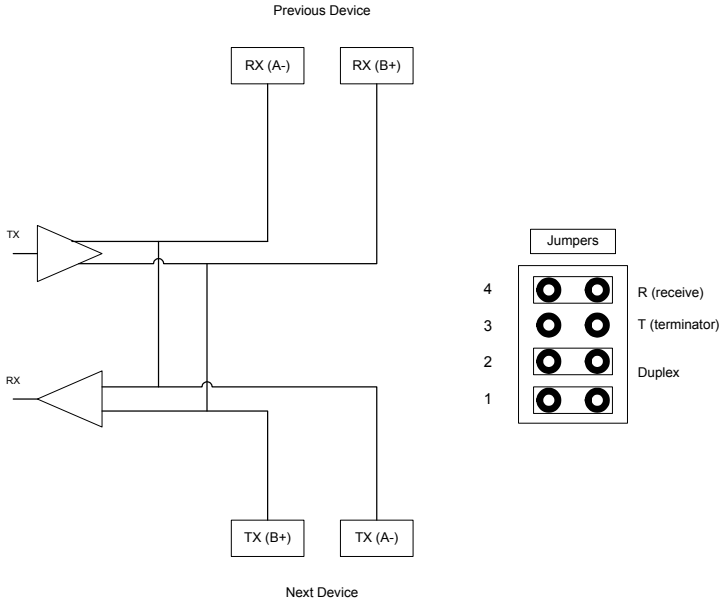
On the die cast enclosure, apply the label marked Model 350 STD to the outside of the enclosure. The supplied label RS485 COMM should completely cover the RS232 COMM portion of the factory installed label.




## Half Duplex (2-wire)

Installing jumpers 1, 2 and 4 on the RS-485 option board electrically connects pin RX B(+) to pin TX B(+), and pin RX A(-) to pin TX A(-) on the option board. This effectively provides two + and two - pin connections, enabling easy connection of network lines in parallel from device to device without having to position two wires into the same lever socket. A B(+) line from each device on the network should be connected in parallel to the next device on the network. This is also true for all A(-) lines.

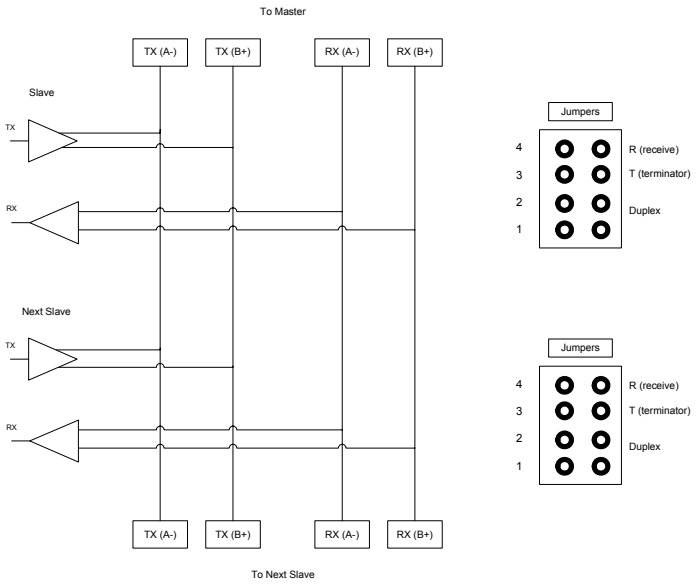
The units inside the two end-points of the network loop will utilize both A(-) pin connections and both B(+) pin connections. The units at the end-points of the network will utilize only one A(-) pin connection and one B (+) pin connection.



### Full Duplex (4-wire)

Removing jumpers 1, 2 and 4 on the RS-485 option board requires that the transmit and receive lines be wired independently of one another. The RX B(+) and RX A(-) receive lines must be wired in parallel to the next device's RX B(+) and RX A(-) receive lines , and the TX B(+) and TX A (-) transmit lines must be wired in parallel to the next device's  TX B(+) and TX A(-) transmit lines.

In order to connect network lines in parallel from device to device it is necessary to position two wires into the same lever socket. This requires that the wire used to build the network be 24 AWG or smaller to allow both wires to fit into the same lever socket.




### Both Half Duplex and Full Duplex

The network boards on both end-points should install jumper 3 on the RS-485 option board to engage the 120 Ω termination resistor (R8). The boards between the two end-points should remove jumper 3 on the RS-485 option board.

The isolated ground (ISO GND) should be connected in parallel from unit to unit. A shielded twisted two pair cable is recommended throughout the network.

## 3.7 20 mA Current Loop Option

The 20mA option will convert the communication port of the indicator from RS-232 to 20 mA current loop. This is a digital communication signal and should not be confused with a 4 to 20-mA (or 0-20 mA) which is an analog output signal. The intended use is primarily printers and scoreboard displays.

This option will mount into the socket for the comm port RS-232 chip on the main board. This option will exclude the use of the RS-485 option board. (I.e. only the RS-485 OR the 20 mA option can be installed into an indicator). Three snap-in stand-offs are included with the board to secure it to the main board beneath it.

## 3.7.1 Install the 20mA Current Loop Option:

1. Open the indicator in order to gain access to the main board.
2. Remove the RS232 IC from its socket. (See table for location)
3. Remove the white wire jumper. (See table for location)
4. Snap the plastic spacers into the three mounting holes.
5. Gently press the option board into the socket.
6. Apply the proper portion of the included sticker to the COMM port. The label will either go over the silk screen on the board or on the rear cover. (See table for location)
7. Reassemble the indicator.

| Location of Components to Remove | | |
|---|---|---|
| | **350 Die cast** | **350/355 SS** |
| RS232 IC | U6 | U4 |
| Jumper | E2 | E3 |
| Label Location | Rear Cover | J6 |

## 3.7.2 Bi-Directional

Both the transmit output and the receive input of the indicator are available as 20 mA signals. None of the handshake signals are supported for the 20-mA current loop operation.

### Baud

Only baud rates of 9600 baud and less are supported.

### Active / Passive

The Tx output may be used as an active or passive output from the indicator. Either active or passive is chosen depending upon which terminals are used for the connections. In active mode the indicator supplies the current. In passive mode, the external device supplies the current. The Rx input is available in passive mode only.

### Isolation

The input and output are electrically isolated from the main board as well as earth ground and each other, for both passive and active modes of operation. Isolation is a minimum of 1000v.

### Max Voltage

Active mode Tx current loop provides a driving voltage of 12v. This will allow 20 mA current flow with up to a 600 ohm load. Passive mode will work with an external driving voltage of up to 50v.

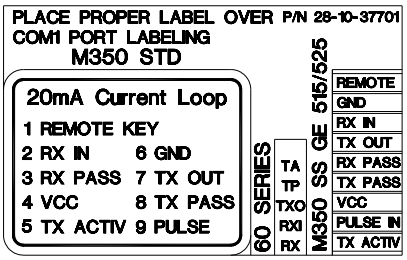
## 3.7.3 Connections

The field connections to the 20 mA circuitry will be made at the main board's comm connector, i.e. the lever connector on the Model 350/355 Stainless Steel version and at the 'D' connector on the Model 350 Zinc Die Cast unit.

### Label

On the stainless steel enclosure, apply the label marked Model 350/355 SS to the main board above J8. Position the label so the REM (remote) on the main board is covered with the REMOTE of the supplied label. The new label will redefine all of the other pin designations.

On the die cast enclosure, apply the label marked Model 350 STD to the outside of the enclosure. The supplied label should completely cover the RS232 COMM portion of the factory installed label.




### Cable

The length for the current loop is 1000 ft. maximum. This is for the entire loop, not from device to device. Example: 1 transmitter and 1 receiver can have a maximum of 500 ft. of 2 conductor cable between them.

## 3.7.4 Connected Devices

While 20 mA current loops can allow for more than one transmitter and/or receiver, the indicator and/or option board do not include any address recognition or collision avoidance and/or detection to promote this usage. If the 20-mA loop is intended to be used in this manner, proper planning for these issues is required.

| Typical Installations | | | |
|---|---|---|---|
| **Model 350/355** | | **External Device** | |
| Passive 20 mA Output | TP | RX+ | Active 20 mA Input |
| | TXO | RX- | |
| Passive 20 mA Input | RXI | RX+ | Active 20 mA Output |
| | RX | RX- | |
| Active 20 mA Output | TXO | RX+ | Passive 20 mA Input |
| | TA | RX- | |

## 3.8 Battery Power Supply

The Battery Module gives the Model 350/355 portability, providing an Model 350/355 with an LCD display and one loadcell 20 hours minimum battery life, or an Model 350/355 with an LED display and one loadcell 8 hours minimum battery life.

This section covers the battery connections on the Model 350/355 main board, the installation of the battery option board, and the battery

### 3.8.1 Mounting

The circuit board and battery fit inside the die cast and stainless steel enclosures. The circuit board acts as the hold down for the battery in both enclosures. Please refer to Figure 3.11 for the Model 350/355 Stainless Steel installation diagram or for installation diagram for the Model 350 Die Cast Enclosure.

Installing the battery option prevents installation of analog or setpoint options.

Review the connection diagrams thoroughly before installing the cable that connects the Model 350/355 main board to the option board. DAMAGE TO THE OPTION BOARD OR INDICATOR CAN RESULT FROM IMPROPER INSTALLATION.

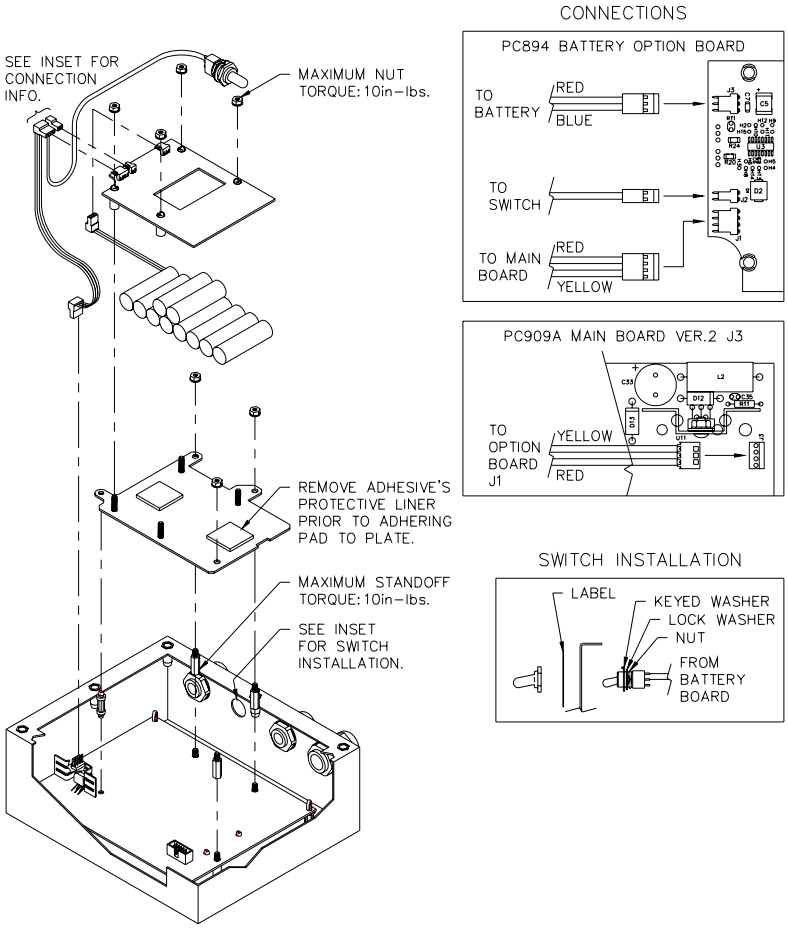



**Figure 3.11 Battery Option Installation (350/355 Stainless Steel)**

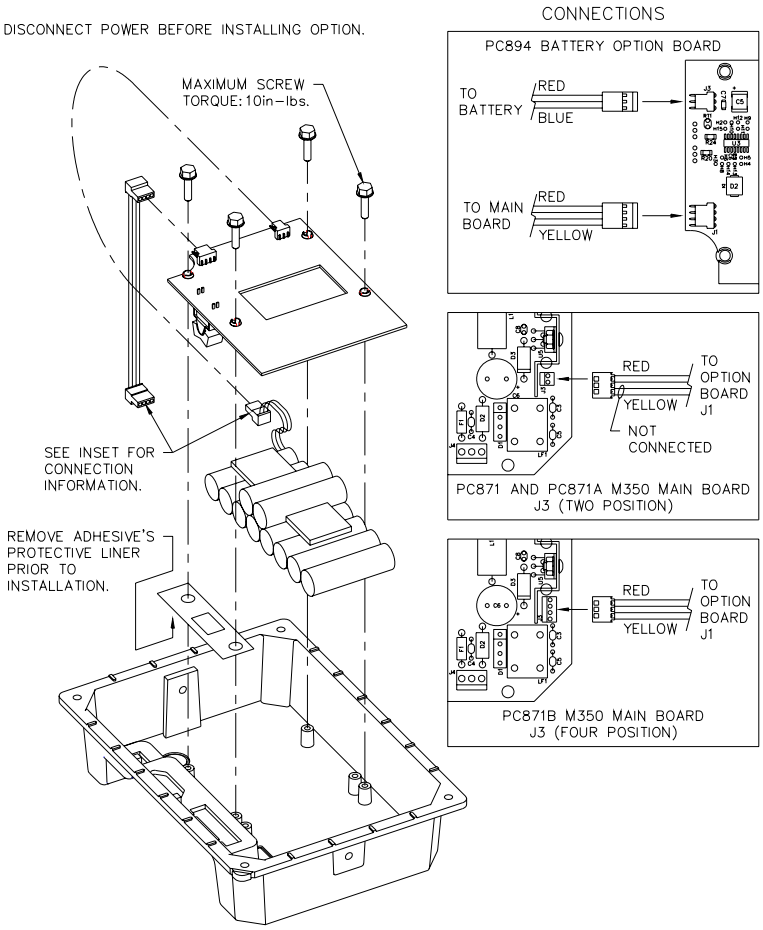



**Figure 3.12 Battery Option Installation (350 die cast)**

## 3.8.2 Connection

See Figure 3.13 for main board battery connections (J3).

| Pin | Description |
|---|---|
| + | Positive terminal (VDC signal input) |
| - | Negative terminal (VDC signal input) |
| L | Low battery indicator terminal (TTL output - +5V OK, 0V Lo Bat) |
| S | Shutdown |
| NOTE: Earlier die cast model's main board may have only 2 or 3 pins (no "L" or "S" pins). | |

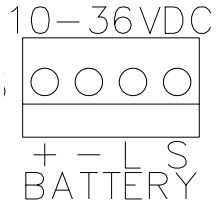



**Figure 3.13 Main Board Battery Connection**

## 3.8.3 ON/OFF Switch

The on/off switch for the Model 350 die cast is a rocker-type switch that mounts in the center rectangular hole punch-out. The on/off switch for the Model 350/355 stainless is a toggle-type (washdown type) switch that replaces one of the available enclosure strain reliefs. The switch is soldered to the board (die cast) or on a cable (stainless).

The Model 350/355 will immediately switch to battery operation when AC power is interrupted if the switch is in the ON position. Placing the switch in the OFF position prevents the battery from running down when AC power is removed. The battery will be charged whenever there is AC power to the Model 350/355, regardless of the switch position.

### Installing the ON/OFF Switch on Older Model 350/355 Stainless Steel Indicators

The 24350B-121B0 kit included a stainless steel washer and a rubber washer to allow mounting of the ON/OFF switch in 44-25-34840 revision.

The switch was mounted in one of the holes for a PG9 size strain relief. The washers were used because the switch barrel diameter was much smaller than the hole diameter. The revision B enclosures have a PG7 size strain relief hole which allows mounting of the switch without the washers. Current Model 350/355 production has switched to the revision B enclosures. The washers are not included in the version 2 option kits for this reason. If you are retrofitting an older Model 350/355 Stainless Steel Indicator, please contact your sales representative to get one each of the following GSE part numbers:

- 36-20-2450 Rubber washer, 0.49 ID x 1.06 OD x 0.093 thick
- 36-20-2455 Stainless washer, 0.5 ID x 1.125 OD x 0.062 thick

## 3.8.4 Battery Charging

If needed, the battery will always be charging when the unit is plugged in, regardless of the switch position. Typically, it takes four hours to fast charge a fully discharged battery.

Battery voltage is monitored to provide a fast charge then a continuous trickle charge to maintain the battery while not in use.

### Overcharge Protection

The battery state is monitored by the charging circuit to prevent overcharge and provide proper charge termination. Overcharging is also prevented through temperature sensing.

Battery voltage is monitored during charging to ensure a 100 percent capacity charge. The circuitry includes a safety timer to stop battery fast charging after 264 minutes.

### Temperature Sensing

If the ambient temperature sensor RT1 on the board is colder than 10 degrees C, the battery will trickle charge and not enter fast charge until the temperature rises above 10°C (50°F).

If the battery temperature sensor (connected between battery - and THERMISTOR) is warmer than 60°C (140°F), the charger will stop fast charging and revert to trickle charging. A fast charge cannot happen again until the battery has cooled and the unit is reset by turning off the ON/OFF switch and interrupting the AC power to the Model 350/355.

## 3.8.5 Low Battery Indication

The Low Battery indication occurs when the battery is discharged below 11.4 VDC. Parameter 426 (P426) enables or disables the low battery indication. Low battery will be indicated continuously if this feature is enabled without the battery option installed.

### Display indication

A Model 350/355 with LED display will flash "LoBat" on the display as a warning when the battery is low. A Model 350/355 with LCD display will turn on the square indicator between the MOTION and GROSS indicators on the bottom of the display. LOBAT is written above the indicator on the LCD lens.

#### *Required hardware*

You must have the following hardware in order to use low battery indication:

Model 350 Die cast:

- PC871B Main Board (4 positions on J3)
- 450350-01006 Revision 6 EPROM (or newer)

Model 350/355 Stainless:

- PC891A Main Board (J3 position 3)
- PC909 Main Board (J3 position 4)
- PC993B Main Board (J12 position 4)
- 450350-01006 Revision 6 EPROM (or newer)

## 3.8.6 Dead Battery Shutdown

The battery option disconnects battery power to the Model 350/355 before erratic operation can occur. The shutdown occurs at a battery voltage of 10 VDC. The switch must be clicked from ON to OFF to ON again to activate battery power after it has shut down. This feature is part of the circuitry on the battery option board. The Model 350/355 Main Board type and EPROM version do not affect its use.

### Automatic Shutdown

The Battery Option System Version 2 has an automatic power off feature that is enabled by parameter 427 (P427). This feature allows the Model 350/355 to shut itself off using a programmable time period of inactivity on the scale. The choices for the time period are in minutes: 0.5, 1, 2, 3, 4, 5, 10, 15, 20, 25, 30, 35, 40, 45, and 60.

You must have the following hardware in order to use the auto power off feature:

Model 350 Die cast:

- PC871B Main Board (4 positions on J3)
- 450350-01006 Revision 6 EPROM (or newer)

Model 350/355 Stainless:

- PC909 Main Board (J3 position 4)
- PC993B Main Board (J12 position 4)
- 450350-01006 Revision 6 EPROM (or newer)

Version 1 kits (GSE P/N: 24350B-120B0-- Zinc Die Cast Model and GSE P/N: 24350B-121B0-- Stainless Steel Model) do not support automatic shutdown.

The original option kits included revision A of the battery option board, PC894. This board did not have the automatic power off feature. The automatic power off feature cannot be added to this version of the option kit. All of the other features listed above will function with this version.

## 3.9 International Transformer - IEC

The Model 350 zinc die cast transformer (GSE P/N 20-20-35190) allows the 350 to run on overseas current. Mounting tabs and line cords provide installation flexibility, allowing easy mounting to walls, tables, shelves, etc.

*Transformers are available for Zinc Die Cast models only.*

### 3.9.1 Specifications

Operates on 230VAC input at 50 hz with an output of 20VAC @ 1 Amp max.

Cord length from transformer to indicator is six feet (two meters) and includes the standard 3-prong Model 350/355 input plug.

Cord length from the transformer to the IEC (male) plug end is another six feet (two meters).

#### Transformers Available

Model 350 Zinc Die Cast Transformer (GSE part # 20-20-35190)

#### IEC Line Cords Available

- GSE part # 22-30-1022 - for use in Australia, Argentina, New Zealand, and China
- GSE part # 22-30-1023 - for use in Chile and Italy

*The transformers can be ordered separately or with an instrument specified below:*

- Model 350 Zinc Die Cast LED Display (GSE P/N 200350-28010)
- Model 350 Zinc Die Cast LCD Display (GSE P/N 200235-28020)

## 3.10 Fiber-Optic Interface

It is possible to use setpoints and analog output in a hazardous area by interfacing a Model 350IS or 355IS indicator to a stainless steel Model 350 or 355 indicator. A fiber-optic communication kit (24350B-420B0) is necessary for connecting the hazardous area and safe area indicator. The fiber-optic communication kit provides all hardware necessary to link the hazardous and safe area indicators. Refer to the Model 350/355 I.S. Service manual for hazardous indicator installation instructions.

### 3.10.1 Fiber-optic Board Installation

1. Remove the rear panel screws of the stainless steel model.
2. Locate the fiber-optic board connector (J16) on the stainless steel model main board.
3. Snap the (4) ½ nylon standoffs provided with the fiber-optic board into the holes surrounding the J16 connector.
4. Place the fiber-optic board on the standoffs but do not press onto the standoffs.
5. Line up the J1 connector on the back of the fiber-optic board with J16 on the stainless steel model main board.
6. Press the fiber-optic board onto the plastic standoffs.
7. Remove the rubber plugs from the J2 and J3 connectors.
8. Follow the instructions below for installing the fiber-optic cable to the fiber-optic board.

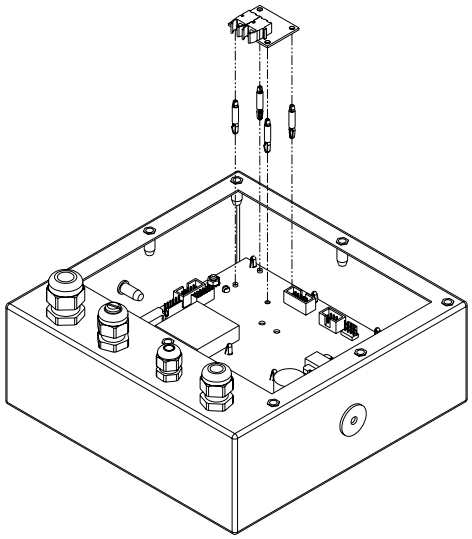


**Figure 3.14 Fiber Optic Board Installation**

## 3.10.2 Plastic Fiber-optic Cable Installation and Termination

The plastic fiber-optic cable is an inexpensive way to connect an intrinsically safe indicator to a safe area hub indicator. The cable allows a distance of 200 feet maximum.

1. Unscrew cap from the strain relief next to the loadcell strain relief.
2. Remove rubber grommet from inside the strain relief
3. Insert the two-hole seal which was included with fiber-optic board kit. Install the small end of the seal first.
4. Reinstall the strain relief cap on the strain relief, but do not tighten. Refer to Figure 3.15.
5. Peel apart conductors of plastic fiber cable approximately 1'.
6. Insert plastic fiber conductors through seal holes in the strain relief.
7. Terminate plastic fiber conductors by using snap-on connectors (GSE p/n 26-20-4531) and polishing kit (GSE p/n 31-80-0225) according to termination instructions (GSE p/n 39-10-42119).
8. Plug fiber connectors into connectors on fiber-optic board. Make sure that RX goes to TX and TX goes to RX.
9. Tighten stain relief cap.

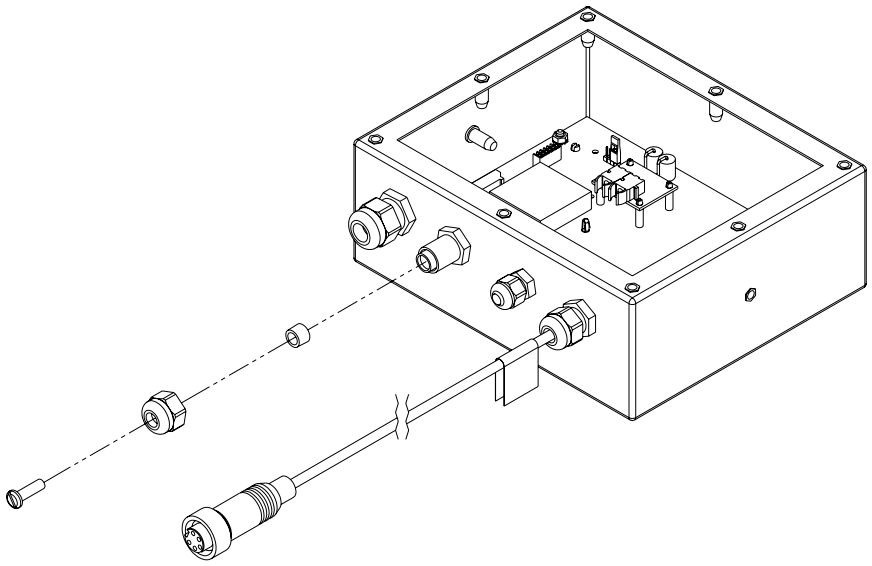


**Figure 3.15 Fiber-optic Cable Installation and Termination**

## 3.10.3 HCS (Hard Clad Silica) Fiber-optic Cable Installation

The HCS cable is glass fiber in a round jacket. The cable allows a distance of 1000 feet maximum. Since HCS fiber-optic cable is not easily fabricated on site and tooling is too expensive for on time use. Prefabricated cables in 100 feet increments can be purchased from GSE. The cable comes ready to install with connecting ends and a strain relief for the enclosure.

1. Remove the strain relief to the right of the load cell strain relief.
2. Insert the strain relief of the HCS cable through the strain relief hole of the enclosure.
3. Slide the strain relief nut over the HCS cable and screw it to the strain relief. Tighten nut with a 7/8" socket or wrench.
4. Plug fiber connectors into connectors on fiber-optic board.
5. Tighten stain relief cap.

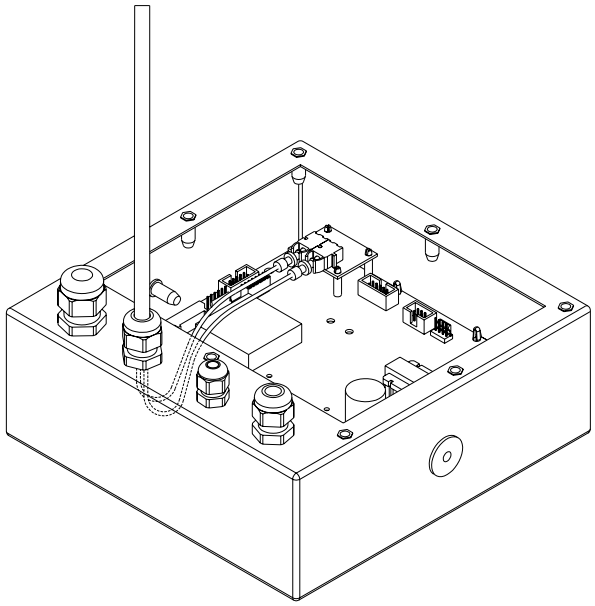


**Figure 3.16 Fiber-optic Cable Installation (HCS cable)**

# 4 Setup Mode and Parameters

This chapter contains detailed information on the parameter setup mode. Topics covered include accessing the parameter setup mode, navigating setup parameters, entering parameter values, exiting the parameter setup mode, and downloading setup parameters.

Setup parameters are dedicated memory registers within the Model 350/355 indicators that collectively define how the scale operates. These parameters can only be accessed by entering the setup mode as described in this chapter.

A setup parameter is identified by the letter "P" followed by a three, four or five-digit number and a decimal point. The example below shows parameter 109 (P109), the parameter used to enable a scale for use.

The digits to the right of the decimal point define the current numeric selection for the displayed parameter.

The parameter name and text selection appears in the prompting section of the display.

## 4.1 Accessing the Setup Mode

In order to modify a setup parameter, the setup mode must first be accessed. This is not necessary for just viewing a parameter value.

*Access to the parameters is restricted by an entered security access code and/or a pin jumper located on the main circuit board. If the program jumper is set to "NO" you will not be granted access to the edit setup parameters by any means even if attempting to enter a security access code. Attempting to do so will result in a "Code 16~Check Jumpr" error message*

### 4.1.1 View-only Access

It is possible to view the current configuration by simply keying in the desired parameter number then [SELECT] [ENTER]. This is only for viewing current parameter values, no modifications will be allowed.

**Model 350**

1. From the Weigh Mode, press [ZERO] + [SELECT] simultaneously
   - ❍ DISPLAY READS > Setup ~ Enter Code
2. Press [TARE]
   - ❍ DISPLAY READS > No ~ Chgs

     P110.- - ~ F.S.= ~ 100

**Model 355**

1. From the Weigh Mode, key in 100 [SELECT]
   - ❍ DISPLAY READS > Setup ~ Enter Code
2. Press [ENTER]
   - ❍ DISPLAY READS > No ~ Chgs

     P110.- - ~ F.S.= ~ 100

## 4.1.2 Full Edit Access

In order to change the current selection for any of the setup parameters you must access the setup mode by keying in the desired parameter number and entering a security access code.

These keystrokes must be made within five seconds, or the indicator will return to the Weigh Mode.

**Model 350**

1. From the Weigh Mode, press [ZERO] + [SELECT] simutaneously
   - ❍ DISPLAY READS > Setup ~ Enter Code
2. Press [SELECT]
   - ❍ DISPLAY READS > .
3. Press [ZERO]
   - ❍ DISPLAY READS u ..
4. Press [PRINT],
   - ❍ DISPLAY READS > …
5. Press [UNITS]
   - ❍ DISPLAY READS > ….
6. Press [TARE]
   - ❍ DISPLAY READS > Chgs ~ Poss!

     P110.- - ~ F.S.= ~ 100

**Model 355**

1. From the Weigh Mode, key in 100 [SELECT]
   - ❍ DISPLAY READS > Setup ~ Enter Code
2. Key in 23640 [ENTER]
   - ❍ DISPLAY READS > Chgs ~ Poss!

     P110.- - ~ F.S.= ~ 100

## 4.2 Selecting a Parameter

### 4.2.1 Advance to the next Parameter

**Model 350 and Model 355**

1. While in the setup mode, press [SELECT]
2. Continue pressing [SELECT] to advance through setup parameters.

### 4.2.2 Access the Previous Parameter

**Model 350**

1. Press [PRINT]
   - ❍ DISPLAY READS >.
2. Press [SELECT]
3. Repeat steps 1 and 2 to back up one parameter.

**Model 355**

1. Press [ .]
   - ❍ DISPLAY READS >.
2. Press [SELECT]
3. Repeat steps 1 and 2 to back up one parameter.

*When accessing a parameter, the parameter number appears briefly. The display then toggles between the parameter name and selection. Pressing [UNITS] will again briefly display the parameter number.*

### 4.2.3 Access a Specific Parameter

The instructions below will show how to access parameter 200 (P200).

**Model 350**

1. Press [PRINT] four times to select the first digit.
   - ❍ DISPLAY READS > 2
2. Press [UNITS] to advance to the next digit.
   - ❍ DISPLAY READS > 2.
3. Press [PRINT] once to select the next digit.

- DISPLAY READS > 20

4. Press [UNITS] to advance to the next digit.
   - DISPLAY READS > 20.
5. Press [PRINT] once to select the next digit.
   - DISPLAY READS > 200

Press [SELECT] to advance to the parameter.

- DISPLAY READS > P200.00 ~ Baud ~ 9600

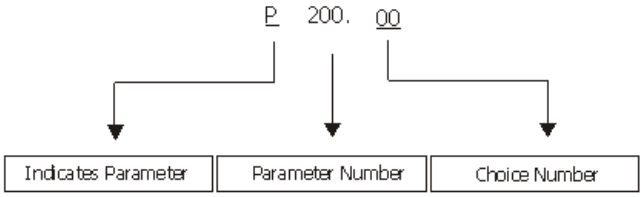
**Model 355**

1. Key in 200 [SELECT]
   - DISPLAY READS > P200.00 ~ Baud ~ 9600

## 4.3 Changing a Parameter Value

### 4.3.1 Selection Parameters

Selection parameters have a pre-defined list of choices to pick from. Each choice is numbered and corresponds to a certain value. The choice number is shown to the right of the decimal point within the parameter number. Repeatedly pressing [TARE] (Model 350) or [ENTER] (Model 355) while viewing a selection parameter cycles through the available choices, or you can key in the choice number.



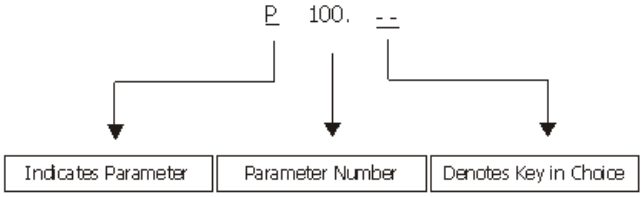

For example, parameter 200 is a selection parameter that holds the baud rate for the serial. This is a selection parameter because a choice number between 00 and 06 must be used. Each choice number corresponds to a different baud rate. To change the baud rate from the default value of 9600 to 4800, perform the following steps from the Setup Mode.

**To change the baud rate from the default value of 9600 to 4800:**

1. Access parameter 200 (P200). Refer to Selecting a Parameter on page 63 on how to access a specific parameter.
2. Press [TARE] (Model 350) or [ENTER] (Model 355) until 4800 is displayed.

## 4.3.2 Key-in Parameters

Key-In Parameters are not limited to a list of choices, although there may be upper and lower value limits. A Key-In Parameter requires that a numeric value be entered using the front panel keys. Key-In Parameters are shown with two hyphens after a decimal point within the parameter number.




### Model 350

***To enter a Key-In Parameter***

1. Press [PRINT]. A decimal point is used to represent the entry position.
2. Press [PRINT] until the desired character appears.
3. Press [UNITS]. Another decimal point indicates the next entry position.
4. Repeat steps 2 and 3 until your desired entry value is shown.
5. Press [TARE] to enter your numerical value.

***To setup a full scale value (example: 250 lbs)***

1. Access the setup mode.
2. Press [PRINT] four times to select the first digit.
3. Press [UNITS] to advance to the next digit.
4. Press [PRINT] six times to select the next digit.
5. Press [UNITS] to advance to the next digit.
6. Press [PRINT] once to select the next digit.
7. Press [TARE] to enter the value.

### Model 355

***To enter a Key-In Parameter***

1. Key in the number by using the numeric keys.
2. Press [SELECT] to accept the entry.

***To setup a full scale value (example: 250 lbs)***

1. Access the setup mode.
2. Key in 250 [ENTER] to accept the entry.

## 4.4 Exiting the Setup Mode

Any parameters that were changed must be saved before that change will take effect.

*When exiting the Setup Mode, the Model 350/355 prompts whether to enter the Calibration Mode. The display will then prompt to save any changes.*

### Model 350

***To exit the Setup Mode and save changes***

1. Press [ZERO] to begin exiting Setup Mode.
2. Press [ZERO] to bypass Calibration Mode.
3. Press [TARE] to save setup changes.
4. Press [TARE] to complete exit.

***To exit the Setup Mode from the view-only mode***

1. Press [ZERO] to begin exiting Setup Mode.
2. Press [TARE] to complete exit.

***To exit the Setup Mode without saving changes***

1. Press [ZERO] to begin exiting Setup Mode.
2. Press [ZERO] to bypass Calibration Mode.
3. Press [ZERO] to exit without saving changes.
4. Press [TARE] to undo changes.
5. Press [TARE] to complete exit.

### Model 355

***To exit the Setup Mode and save changes***

1. Press [ZERO] to begin exiting Setup Mode.
2. Press [CLR] to bypass Calibration Mode.
3. Press [ENTER] to save setup changes.
4. Press [ENTER] to complete exit.

***To exit the Setup Mode from the view-only mode***

1. Press [ZERO] to begin exiting Setup Mode.
2. Press [ENTER] to complete exit.

***To exit the Setup Mode without saving changes***

1. Press [ZERO] to begin exiting Setup Mode.
2. Press [CLR] to bypass Calibration Mode.
3. Press [CLR] to exit without saving changes.
4. Press [ENTER] to undo changes.
5. Press [ENTER] to complete exit.

## 4.5 Factory Default

Parameter 65001 and 65002 are available to return the Model 350/355 to factory settings. Parameter 65001 will reset parameters including the calibration, while parameter 65002 resets all parameters except the calibration.

### 4.5.1 Return to factory default (350):

Access the setup mode. See page 61 for details.

1. Key in 65001 or 65002 [SELECT]
2. Press [TARE] once.
3. Press [TARE] once.
4. Press [ZERO] [ZERO] [TARE] [TARE]

### 4.5.2 Return to factory default (355):

Access the setup mode. See page 61 for details.

1. Key in 65001 or 65002 [SELECT]
2. Press [ENTER] once.
3. Press [ENTER] once.
4. Press [ZERO] [CLR] [ENTER] [ENTER]

## 4.6 List of Parameters

The Model 350 and Model 355 have several parameters that can be configured to your specific application. Below is a table of the available parameters. Refer to page 71 for explanations of each parameter.

| Parameter Number | Display Name | Default Value | Valid Range/ Choices | Parameter Description | Page |
|---|---|---|---|---|---|
| **P110.--** | F.S.= | 100.00 | .01 - 999,999 (Keyed In) | Full Scale | 71 |
| **P111.09** | 1Grad | .01 | .00001 - 500 (24 Selections) | Count By | 71 |
| **P112.05** | Ztrac | 0.5d | Off - 20.0d (200 Selections) | Zero Track Aperture | 71 |
| **P114.10** | Stabl | 1.0d | Off - 20.0d (200 Selections) | Stability Window | 71 |
| **P115.10** | StDly | 1 Sec | 0.05 - 10.0 Sec (101 Selections) | Stability (Motion) Delay | 71 |
| **P116.04** | Filtr | 1 Sec | .065 - 8.00 Sec (8 Selections) | Filter Setting | 71 |
| **P117.01** | Rate= | 0.05 Sec | 0.05 - 20.0 Sec (201 Selections) | Display Update | 72 |
| **P118.12** | Zrang | 100% | .01 - 100% (13 Selections) | Zero Button Range | 72 |
| **P119.00** | LinrZ | Disable | Enable / Disable (Toggle) | Linearization | 72 |
| **P150.00** | Units | lb | lb / kg (Toggle) | Default (Calibration) Units | 72 |
| **P151.01** | Unbut | Enable | Enable / Disable (Toggle) | Units Button | 72 |
| **P152.00** | Unit3 | None | None / ounce / gram / lboz (4 Selections) | Additional Unit | 72 |
| **P161.00** | TarSa | Disable | Enable / Disable (Toggle) | Tare Save | 72 |
| **P166.01** | AutoT | Enable | Enable / Disable (Toggle) | Auto Tare | 72 |
| **P167.01** | TarIn | Disable (350) Enable (355) | Enable / Disable (Toggle) | Keyboard Tare | 73 |
| **P169.00** | AtClr | Disable | Enable / Disable (Toggle) | Auto Tare Clear | 73 |
| **P171.00** | AnAlg | Disable | Enable / Disable (Toggle) | Analog Output Option | 73 |
| **P178.00** | Apsel | APS | None, APS, APSE3, Both (4 selections) | Average Piece Weight View | 73 |
| **P179.00** | Count | Disable | Enable / Disable (Toggle) | Counting Functions | 73 |
| **P200.00** | Baud1 | 9600 | 150 - 115K (13 Selections) | Comm 1 Baud Rate | 73 |

| Parameter Number | Display Name | Default Value | Valid Range/ Choices | Parameter Description | Page |
|---|---|---|---|---|---|
| **P201.01** | Data1 | 8 Bits | 7 - 8 Bits<br>(2 Selections) | Comm 1 Data Bits | 73 |
| **P202.00** | Par 1 | None | None - Odd<br>(3 Selections) | Comm 1 Parity | 73 |
| **P203.00** | Stop1 | 1 Bit | 1 - 2 Bits<br>(2 Selections) | Comm 1 Stop Bits | 74 |
| **P204.02** | HndS1 | Soft | None - Both<br>(4 Selections) | Comm 1 Handshake | 74 |
| **P210.01** | Send1 | Press | Off - ID<br>(5 Selections) | Comm 1 Transmit | 74 |
| **P212.01** | Stbl1 | Delay | Off - Delay<br>(Toggle) | Comm 1 Motion | 74 |
| **P213.01** | Ttyp1 | --1-- | 1 - 16, Custom (Selection) | Print Transmission | 74 |
| **P220.00** | Baud2 | 9600 | 150 - 115K<br>(13 Selections) | Comm 2 Baud Rate | 74 |
| **P221.01** | Data2 | 8 Bits | 7 - 8 Bits<br>(2 Selections) | Comm 2 Data Bits | 74 |
| **P222.00** | Par 2 | None | None - Odd<br>(3 Selections) | Comm 2 Parity | 74 |
| **P223.00** | Stop2 | 1 Bit | 1 - 2 Bits<br>(2 Selections) | Comm 2 Stop Bits | 74 |
| **P224.02** | HndS2 | Soft | None - Soft<br>(2 Selections) | Comm 2 Handshake | 74 |
| **P230.01** | Send2 | Press | Off - ID<br>(5 Selections) | Comm 2 Transmit | 75 |
| **P232.01** | Stbl2 | Delay | Off - Delay<br>(Toggle) | Comm 2 Motion | 75 |
| **P233.01** | Ttyp2 | --1-- | 1 - 16, Custom<br>(Selection) | Print Transmission | 75 |
| **P250.00** | RS485 | Disable | Enable/Disable<br>(Toggle) | Network Option | 75 |
| **P251.00** | Addr | Disable | Disable and 4-254<br>(Key-in) | Network Address | 75 |
| **P260.00** | Type | 350 I.S. | 350 I.S. - Cntrl<br>(4 Selection) | Remote Display Type | 75 |
| **P290.00** | Echo | None | None - Port 2<br>(3 Selections) | Remote Display Master Echo | 75 |
| **P291.02** | Start | <STX> | 0 - 255<br>(256 Selections) | Master Display Start Character | 76 |
| **P292.03** | End | <ETX> | 0 - 255<br>(256 Selections) | Master Display Ending Character | 76 |
| **P296.00** | EStyle | 300 | 300 or 60<br>(2 Selections) | Remote Display Style Echo Format | 76 |
| **P410.--** | Euro | Disable | Enable / Disable 9991/9990<br>(Key In) | OIML Enforce | 76 |

| Parameter Number | Display Name | Default Value | Valid Range/ Choices | Parameter Description | Page |
|---|---|---|---|---|---|
| **P412.--** | PrSEt | Disable | Enable / Disable (Toggle) | OIML Enforce | 76 |
| **P420.01** | Dsply | On | Off - Auto (3 Selections) | Display Function | 76 |
| **P423.00** | Light | Off | ON/OFF (Toggle) | Backlight | 77 |
| **P426.00** | Batt | Disable | Enable/Disable (Toggle) | Battery Option Annunciator | 77 |
| **P427.00** | Apo | Off | Off - 60 minutes (16 Selections) | Auto Power for Battery Option | 77 |
| **P440.00** | rStrc | Disable | Enable / Disable (Toggle) | NTEP Enforce | 77 |
| **P500--** | Tine | 12.00.00 | (Keyed In) | Time/Date Function | 77 |
| **P501--** | Date | 01.01.70 | (Keyed In) | Time/Date Function | 77 |
| **P502.01** | disbl t-dAt | Disable | Enable / Disable (Toggle) | Time/Date Function | 77 |
| **P503.01** | 12 hours | 12 hour | 12 hour/24 hour | Time/Date Function | 77 |
| **P504.00** | Style | U.S.A | U.S.A or International | Time/Date Function | 77 |
| **P505.01** | TdSEL disbl | Disable | Enable / Disable (Toggle) | Time/Date Function | 77 |
| **P800.00** | But1 | None | None - Print/Tare (5 Selections) | Remote Button Function | 78 |
| **P801.00** | But2 | None | None - Print/Tare (5 Selections) | Remote Button Function | 78 |
| **P802.00** | tZdef | None | None - Port 2 (3 Selections) | Remote Button Function | 78 |
| **P1000.--** | Cust.tran1 | -- | -- | Custom Transmit 1 | 78 |
| **P2000.--** | Cust.tran2 | -- | -- | Custom Transmit 2 | 78 |
| **P5000.00** | TArGt | Disable | Enable / Disable (Toggle) | Target Key | 78 |
| **P5002.00** | StoP | Disable | Enable / Disable (Toggle) | Stop Key | 78 |
| **P5003.00** | StArt | Disable | Enable / Disable (Toggle) | Start Key | 79 |
| **P5004.00** | Chec | Auto | Auto / Start (Toggle) | 355 Restart Mode | 79 |
| **P5010.00** | SPAnn | Enable | Enable / Disable (Toggle) | Setpoint Annunciators | 79 |
| **P5011.00** | SPBar | Disable | Enable / Disable (Toggle) | Bargraph Display | 79 |
| **P5012.00** | BarPc | 50% | 0 - 100 (Key In) | Bargraph Scaling | 79 |
| **P5100.00** | SetPt | None | None - Checb (9 Selections) | Setpoint Operation | 79 |

## 4.7 Parameter Map Details

### P110 Full Scale Value (Key in)

Denotes the full scale capacity. This value should not exceed the rated capacity of the weighing device.

### P111 Division Size (Selection)

Indicates the count-by and decimal point. Pressing [ZERO] + [TARE] (Model 350) or [CLR] (Model 355) will automatically select the choice closest to 10,000 divisions without exceeding 10,000 divisions.

### P112 Zero Track Aperture (Selection)

Set in terms of number of divisions. Zero tracking eliminates small weight deviations at or near zero. Weight deviations within the selected window that have been stable for more than one second are tracked off, maintaining a gross or net zero condition.

The sum of weight values zeroed with auto zero tracking and [ZERO] cannot exceed the allowable zero range (P118).

To determine the proper setting in a counting application, divide the weight of the smallest product counted by the division size (P111). Zero Track should be set to 0 (off) for most setpoint filling operations. This prevents tracking off any product trickle at the start of a fill process.

### P114 Stability (Selection)

Stability is defined as weight fluctuations within an aperture that can be regarded as being a stable weight. Deviations outside this aperture are considered motion, and the motion annunciator on the front panel will light accordingly. Once the scale settles within the stability aperture, the indicator will wait for a period of time specified by the motion delay (P115) before the indicator is considered stable.

Print operations configured as motion delayed (P114) will not send the specified data until the weight reflects a stable reading as designated by this setting. Certain setpoint operations are also considered motion delayed and will not change states until a no-motion condition exists.

### P115 Stability Delay (Selection)

Selects the stability (motion) time delay to a resolution of 0.1 seconds. For example, an entry of 25 will be accepted as 2.5 seconds.

### P116 Filter (Selection)

Sets the indicator response time in terms of seconds. Filtering determines how quickly the indicator will respond to changing input signals. A low filter setting speeds the response, a higher filter setting will 'dampen' the response.

Filtering is used to filter out weight fluctuations caused by outside sources, such as vibrations or air currents.

### P117 Rate (Selection)

Specifies how often the display is updated with new data and the rate of continuous transmits (if P210 or P230 are enabled). For example, if 0.05 is selected, the controller will write data to the display and send continuous transmits 20 times a second. Selections from 0.05 to 20.0 seconds are available. The actual rate may be less than (P117). The actual rate depends on the indicator speed (P60090), the size and number of transmits (P1000, P2000, P210, and P230), and COM ports' speed (if echo (P290) is enabled or continuous transmits are enabled).

### P118 Zero Range (Selection)

Specifies how many divisions can be zeroed in terms of a percentage of full scale (P110). The sum of weight values zeroed through the [ZERO] key and auto zero tracking cannot exceed this range.

A zero range of 5% is commonly used with large tank scales to avoid accidental zeroing of a full or partially full tank.

### P119 Multi-Point Linearization (Toggle)

Enable the five-point linearization feature used during load cell calibration.

### P150 Units (Toggle)

Set default units to 'lb' or 'kg'. The indicator must use the default units during calibration procedures. The default units are the displayed units upon indicator power-up.

### P151 Units Button (Toggle)

When enabled, this parameter will allow the [UNITS] key to toggle the units between lb and kg (1000g). When disabled, the indicator will show only the calibration units as determined by P150.

### P152 Third Unit (Selection)

This parameter will allow the choice of three additional units (ounces, grams or lb oz) that may be accessed with the [UNITS] key. Only one unit will be available at a time. The third unit can only be selected if P151 is enabled. The additional unit will be identified by an annunciator on the display. This unit selection is not legal for trade.

### P161 Tare Save (Toggle)

Enabling Tare Save allows the indicator to retain the tare value in the event of power loss. The correct net weight is restored upon power-up.

### P166 Auto Tare (Toggle)

When enabled, pressing [TARE] will wait for a no-motion condition and then bring the scale to a net zero reading. Disabling will prevent keypad tare operations.

*Note that if a setpoint activation method is set to [TARE], disabling Auto Tare will also disable the activation of that setpoint.*

### P167 Keyboard Tare (Toggle)

If P167 is disabled, the user cannot view tare using the select key. A numeric tare (manually entering tare) will not be accepted and show a msg *Funct" "disbl*. The only way a tare value can be entered is by using the automatic tare (press [TARE] to tare the weight on the scale). When P167 is on, the user can view tare using the select key (tare will follow Net). The unit will accept numeric tare. On the Model 355, users can use the numeric keypad. On the Model 350, users can use [PRINT] and [UNITS] to scroll in an entry.

### P169 Auto Tare Clear (Toggle)

Enabling this feature will cause the current tare value to be cleared to zero every time the indicator stabilizes within 5 graduations of gross zero.

### P171 Analog (Toggle)

Enable or disable the optional analog output module. See Analog Output Setup on page 131 for all parameters associated with the Analog Output Module.

### P178 Average Piece Weight (APS) View

Select how the average piece weight (APW) will be displayed with the [SELECT] key. Be sure to enable P179 (Count) to use this parameter. Chose one of the following:

| Choice Number | Selection Name | Description |
|---|---|---|
| P178.00 | None | Average piece weight (APS) will not be displayed with the [SELECT] key. |
| P178.01 | APS | Display the average piece weight (APS) after the QTY parameter. |
| P178.02 | APSE3 | Display the average piece weight (APS) * 1000 after the QTY parameter. |
| P178.03 | both | Display both the Average piece weight (APS) and APS * 1000 through the [SELECT] key. |

### P179 Count (Toggle)

When enabled, the quantity mode becomes accessible via the [SELECT] key. The quantity mode is identified by the illumination of the QTY annunciator.

### P200 Baud (Comm 1) (Selection)

Set the desired baud rate for the communication port. 150 - 115K bps

### P201 Data Bits (Comm 1) (Toggle)

Select 7 or 8 data bits for the transmission.

### P202 Parity (Comm 1) (Selection)

Select Odd, Even or None for the transmission parity.

### P203 Stop Bits (Comm 1) (Toggle)

Select 1 or 2 stop bits for communication port transmissions.

### P204 Comm Handshake (Comm 1) (Selection)

Select from None, Software (Xon/Xoff), Hardware (CTS/RTS), or Both.

### P210 Send (Comm 1) (Selection)

Transmission Send options:

| Choice Number | Selection Name | Description |
|---|---|---|
| P210.00 | Off | All transmissions disabled. |
| P210.01 | Press | Sends transmission with [PRINT] key. |
| P210.02 | Cont. | Sends transmissions continuously. |
| P210.03 | Cycle | Send single transmission after weight is reached and motion ceases. Must return display value below 0.1% of F.S. to reset for next transmission. |
| P210.04 | ID | Sends transmission with the stored ID. |

### P212 Send Stability (Comm 1) (Toggle)

Enabling Send Stability will delay any transmissions until a no-motion condition exists.

### P213 Transmit Selection (Comm 1) (Selection)

Select desired print output (1 - 16 or custom). The transmission will be initiated by the selected print operation (P210) and / or the Remote Key selection (P800). See page 81 for details on preset formats or page 84 for details on custom transmit.

### P220 Baud (Comm 2) (Selection)

Set the desired baud rate for the communication port. 150 - 115K bps.

### P221 Data Bits (Comm 2) (Toggle)

Select 7 or 8 data bits for the transmission.

### P222 Parity (Comm 2) (Selection)

Select Odd, Even or None for the transmission parity.

### P223 Stop Bits (Comm 2) (Toggle)

Select 1 or 2 stop bits for communication port transmissions.

### P224 Comm Handshake (Comm 2) (Selection)

Select from None and Software.

### P230 Send (Comm 2) (Selection)

Transmission Send options:

| Choice Number | Selection Name | Description |
|---|---|---|
| P230.00 | Off | All transmissions disabled. |
| P230.01 | Press | Sends transmission with [PRINT] key. |
| P230.02 | Cont. | Sends transmissions continuously. |
| P230.03 | Cycle | Send single transmission after weight is reached and motion ceases. Must return display value below 0.1% of F.S. to reset for next transmission. |
| P230.04 | ID | Sends transmission with the stored ID. |

### P232 Send Stability (Comm 2) (Toggle)

Enabling Send Stability will delay any transmissions until a no-motion condition exists.

### P233 Transmit Selection (Comm 2) (Selection)

Select desired print output (1 - 14 or custom). The transmission will be initiated by the selected print operation (P210) and / or the Remote Key selection (P800). See page 81 for details on preset formats or page 84 for details on custom transmit.

### P250 RS-485 Multi-Drop Network (Toggle)

Enable / disable the RS-485 multi-drop network option. Requires that an RS-485 option board be installed. This option allows up to 250 RS-485 devices to be networked together in either a half duplex or full duplex wiring scheme. See the RS-485 Multi-Drop Network Setup and Operation section beginning on page 89 for complete details on RS-485 setup and operation.

### P251 Address (Key in)

Specifies the address of the controller for RS-485 multi-drop communications. Allowed choices are 0 (disabled) and 4 - 254.

### P260 Master, Remote Display or Safe Area Hub (Selection)

Select the mode of operation.

| Choice Number | Selection Name | Description |
|---|---|---|
| P260.00 | 350/ 355 | Sets indicator as the master device. |
| P260.01 | R-dsp | Sets the indicator as a slave device. P261 - P283 will be available. |
| P260.02 | Hub. | Sets the indicator to a safe area hub. |
| P260.03 | Cntrl | Sets the indicator to the master controller for fiber-optic interface to the safe area hub. |

### P290 Echo Display (Toggle)

Determines which comm. port will be echoed to another device. Selections are None, port 1, port 2.

### P291 Start Character (Key-in)

Set the start character for the master indicator. Choices are 0 - 255. Default value is 2 (STX). The choice must match the start character at P274 of the remote display (slave). A value of 0 means that a byte with the value 0 will be sent for the character. Avoid using values of 17 or 19 when using software flow control. The values of 17 and 19 are Xon and Xoff codes and could cause conflict.

### P292 End Character (Key-in)

Set the end character for the master indicator. Choices are 0 - 255. Default value is 3 (ETX). The choice must match the end character at P275 of the remote display (slave). A value of 0 means that a byte with the value 0 will be sent for the character. Avoid using values of 17 or 19 when using software flow control. The values of 17 and 19 are Xon and Xoff codes and could cause conflict.

### P296 Echo Style (Toggle)

Set the style of indicator the display will be echoed to. Choose from 300 or 60. The 300 choice is for 350, 355, 350 I.S., 355 I.S., 351, ABS 4100. The 60 choice is for 460 series, 560 series and 660 series indicators.

### P410 Euro (Toggle)

Enable OIML legal-for-trade restrictions (see page 144).

### P412 Preset Character (Toggle)

If P412 is enabled, it will add a 'P' to the beginning of the tare parameter on the display and transmits if the last tare value was entered manually by the user (numeric entry). P167 needs to be enabled in order to key in a tare value. A 'P' will not be added if the last tare was performed by pressing the tare key or if the tare value is zero (even if the zero value was manually entered by the user). The 'P' prefix stands for "Preset". When P412 is disabled, the unit will never show 'P' before tare no matter how tare is entered.

### P420 Display (Selection)

Select display control option. Choose from On, Off or Auto. The auto setting helps conserve power for extended battery life. When the indicator display is off, the load cell(s) are still powered.

If P420 is set to Off or selection 0, you can turn on the display by holding down the [ZERO] key upon power up. This does not set P420 to On; it only temporarily turns on the large VFD display in order to allow you to see what you are entering.

| Choice Number | Selection Name | Description |
|---|---|---|
| P420.00 | Off | Shuts off the display. |
| P420.01 | On | Normal display operation. |
| P420.02 | Auto | Shuts off the display when weight has stabilized within 6 divisions for 5 minutes. Pressing [ON] or changing weight more than 6 divisions will re-enable the display. NOTE: The display will turn back on if data is received via the RS-232 Port. |

### P423 Back Light (on/off)

Toggle the backlight on a Model 350/355 LCD.

### P426 Low Battery Indication (Toggle)

Press [TARE] to enable or disable this option. Low battery will be indicated continuously if this feature is enabled without the battery option installed. Otherwise, an annunciator will be lit when the battery voltage is low.

### P427 Battery Option Automatic Shutdown (Selection)

Select duration of time for auto shutdown. Choose from selections with the [TARE] key. Selections are off, 0.5, 1, 2, 3, 4, 5, 10, 15, 20, 25, 30, 35, 40, 45, and 60. Choices are in set in minutes.

### P440 Legal for Trade Restrictions (Toggle)

Enable NTEP legal-for-trade restrictions. See Chapter 7 for details.

### P500 Time Setting (key in)

Enter the time in the form HH.MM.SS. Time is always shown in military format within this parameter. P503 will determine how the time is displayed in the weigh mode.

### P501 Date Setting (key in)

Enter the date in the form MM.DD.YY. P504 will determine the how the date is displayed in the weigh mode.

### P502 Time/Date (toggle)

Enables or disables the time and date feature. If enabled the time and date will be accessible from the weigh mode with the [SELECT] key. The weight will continue to be updated when viewing the time or date. The time will be formatted as defined by P503 and the date will be formatted as defined by P504. See page 92 for instructions on how to change the time and/or date.

### P503 Hours (toggle)

Determines the TIME format style, 12 hour or 24 hour. If in 12 hour mode the right most decimal point on the display will become the PM indicator. Note: The time must be entered as military time. If the mode is set for 12 hour, the time will be converted to a 12 hour clock.

### P504 Style (toggle)

Determines the DATE format style, U.S.A. or Int'l. If set for U.S.A, the date will resemble 01/26/01. If set for international, the date will resemble 26/01/01.

### P505 Time/Date Select (toggle)

Enables or disables the editing of time and date the weigh mode.

### P800 Remote Key 1 Operation (Selection)

Select function for Remote Key closure. Choose from None, Print, Tare, Zero or Print/Tare. If a setpoint is configured to use the remote key as an activation method, then the P800 setting is over-ridden. The Remote Key Configuration section on page 94 details the remote key operation. See Remote Key Connection on page 34 for remote key electrical connections.

### P801 Remote Key 2 Operation (Selection)

Select function for Remote Key closure. Choose from None, Print, Tare, Zero or Print/Tare. If a setpoint is configured to use the remote key as an activation method, then the P801 setting is over-ridden. The Remote Key Operation section on page 94 details the remote key operation. See Remote Key Connection on page 34 for remote key electrical connections.

### P802 Tare and Zero Execution (Selection)

When a Zero or Tare event happens the scale will transmit *Tare Executed* or *Zero Executed* <CR> <LF> followed by the transmit specified at P213 (port 1) or P233 (port 2). The port number needs to be selected within this parameter.

### P1000 Custom Transmit 1

A custom transmit is a user-defined string of data that can be sent to the serial port. Parameter P1000 is the beginning of the custom transmit table for transmit 1and must be enabled for transmit by selecting cust at P213. Parameters use three bytes of memory; ASCII characters and control codes use one byte. See P60001 for available memory. The custom transmit cannot be viewed or altered from the indicator. A custom transmit must be entered via the serial port. See Custom Transmit Setup on page 83 for details on designing and loading a custom transmit.

### P2000 Custom Transmit 2

A custom transmit is a user-defined string of data that can be sent to the serial port. Parameter P2000 is the beginning of the custom transmit table for transmit 2 and must be enabled for transmit by selecting cust at P230. Parameters use three bytes of memory; ASCII characters and control codes use one byte. See P60001 for available memory. The custom transmit cannot be viewed or altered from the indicator. A custom transmit must be entered via the serial port. See Custom Transmit Setup on page 83 for details on designing and loading a custom transmit.

### P5000 Target Key (Toggle)

Allows a target value to be entered or viewed. Sending a % <CTRL-A> using a serial device such as a computer is equivalent to pressing the Target key.

### P5002 Stop Key (Toggle)

Enable or disable the use of the stop key from the 355 keypad. Pressing the stop key in the gross, net, tare, APW or quantity modes with setpoint(s) enabled will cause all setpoints to deactivate and pause. Sending a % <CTRL-F> using a serial device such as a computer is equivalent to pressing the Stop key.

### P5003 Start Key (Toggle)

Enable or disable the use of the start key from the 355 keypad. Pressing the Start key in the gross, net, tare, APW or quantity modes with setpoints enabled causes a paused setpoint operation to be resumed. Sending a % <CTRL-E> using a serial device such as a computer is equivalent to pressing the Start key.

### P5004 355 Restart Checkweighing Mode (Toggle)

Determines the method in which the checkweighing mode will be restarted. Auto will restart after return to zero or Manual will restart by pressing the [START] key. If Stop (P5002) is disabled, this function is disabled and parameter 5004 will not appear.

### P5010 Setpoint Annunciators (Toggle)

Enables or disables the setpoint annunciators to the left of the main 7-segment display. Disabling the setpoint annunciators may be desired when the bargraph is enabled while using an LCD display.

### P5011 Setpoint Bargraph (Toggle)

Enables or disables the bargraph display on the LCD version of the Model 350/355 display. This setup parameter only appears if an LCD display is installed.

### P5012 Setpoint Bargraph Low-Limit Percentage (Key in)

Controls the bargraph low-limit percentage value for determining the weighting of each segment of the bar graph. This only appears if an LCD display is installed.

### P5100 Setpoint Operation (Selection)

Sets the desired Setpoint operation. Choose between None, ChecP, Fill, Batch, Discharge, Both, ChecA or Independent. See Setpoint Setup on page 105 for complete details on setpoint setup and operation.

# 5 Configuration

This chapter will cover the different elements of configuring the Model 350/355.

## 5.1 Preset Transmit Selections

The Model 350 and Model 355 provide 16 preset formats for printing tickets or sending data to a computer. Only one format or custom transmit may be enabled at a time.

***Choice 0: Custom Transmit:***

User-defined serial data string (see Custom Transmit Setup on page 83).

***Choice 1: GSE Standard Transmit:***

HH:MM:SS am  MM/DD/YY <CR><LF>
XXX.XX kg Gross<CR><LF>
XXX.XX kg Tare <CR><LF>
XXX.XX kg Net <CR><LF>

***Choice 2: Count:***

HH:MM:SS am  MM/DD/YY <CR><LF>
XXX QTY <CR/LF>
XX.X kg APW <CR><LF>
XXX.XX kg Gross<CR><LF>
XXX.XX kg Tare <CR><LF>
XXX.XX kg Net <CR><LF>

(NOTE: The time and date will only be printed in choice 1 and 2 if P502 is enabled).

***Choice 3: (Condec Clone):***

<STX> <POL> <DATA> <L/K> <G/N> <STAT> <CR> <LF>

Where:

<STX> is a single control code, decimal value of 2.

<DATA> is 8 characters, 1st character is either minus sign or a space, padded with leading spaces, with an embedded decimal point.

<L/K> is a single 'L' or 'K' character to indicate lb or kg units.

<G/N> is a single 'G' or 'N' character to indicate gross or net data.

<STAT> is an 'O' (overload/underload), 'M' (motion), or space otherwise.

<CR> is a single control code (carriage return), decimal value of 13.

<LF> is a single control code (line feed), decimal value of 10.

***Choice 4:***

<STX><SignedDATA><sp><lb/kg><sp><Gross/Net/Qty><STAT><CR>

***Choice 5:***

<STX><Signed DATA><sp><lb/kg><STAT><CR>

***Choice 6:***
<STX><Signed DATA><sp><lb/kg><CR>

***Choice 7:***
<STX><Unsigned DATA><sp><CR>

***Choice 8:***
<STX><Signed DATA><sp><lb/kg><sp><Gross/Net/Qty><STAT><SPS><CR>

***Choice 9:***
<STX><Signed DATA><sp><lb/kg><STAT><SPS><CR>

***Choice 10:***
<STX><Signed Displayed Weight><sp><lb/kg><SPS><CR>

***Choice 11:***
<STX><Unsigned Displayed Weight><SPS><CR>

***Choice 12:***
<STX><Unsigned DATA><sp><lb/kg><sp><Gross/Net/Qty><STAT><CR>

Use choice 12 to send to a 450/455/550 remote display that is set to text mode and a <CR> terminator.

***Choice 13:***
<STX><Unsigned DATA><sp><lb/kg><sp><Gross/Net/Qty><STAT> <CR><LF>

***Choice 14: (Simulates NCI 3835):***
<LF>Signed DATA<CR><LF><STAT><CR><ETX>

| Data Block Name | Description |
|---|---|
| <STX> | A single control code, decimal value of 2. |
| <ETX> | A single control code, decimal value of 3. |
| <POL> | A <space> for positive data or a - for negative data |
| <Signed DATA> | 8 characters right justified, space padded, including a decimal point and polarity sign. Polarity is a '+' or '-' to the immediate left of the most significant digit. |
| <Unsigned DATA> | 8 characters right justified, space padded, including a decimal point. |
| <lb/kg> | Two characters indicating pounds or kilograms. |
| <Gross/Net/QTY> | Single word for gross weight, net weight or quantity. |
| <STAT> | An 'O' (overload/underload), 'M' (motion), or <space> otherwise |
| <SPS> | See <SPS> Setpoint Status below. |
| <CR> | A single control code, decimal value of 13. |
| <LF> | A single control code, decimal value of 10. |
| <sp> | ASCII Space, decimal value of 32. |

***<SPS> Setpoint Status***

Transmitting the setpoint status will reflect the current state of all the setpoints, regardless of which setpoint operation is configured. The status can be read as a single ASCII numeric character (0-7), a Hex value (30h-37h) or a binary bit comparison. Status is preceded by a <space> and an "S". The preceding data stream format is for fixed transmissions of <SPS> as specified above. This is not associated with the custom transmission of parameter P96.

| SP 1 | SP 2 | SP3 | ASCII | Hex | Bit Comparison |
|---|---|---|---|---|---|
| Off | Off | Off | 0 | 30h | 0011 0000 |
| On | Off | Off | 1 | 31h | 0011 0001 |
| Off | On | Off | 2 | 32h | 0011 0010 |
| On | On | Off | 3 | 33h | 0011 0011 |
| Off | Off | On | 4 | 34h | 0011 0100 |
| On | Off | On | 5 | 35h | 0011 0101 |
| Off | On | On | 6 | 36h | 0011 0110 |
| On | On | On | 7 | 37h | 0011 0111 |

***Choice 15: (RSD 3000):***

<STX><G>< Signed DATA ><lb/kg><CR><LF>
<STX><SPS><CR><LF>

***Choice 16: (RSD 3000):***

<STX><N>< Signed DATA ><lb/kg><CR><LF>
<STX><SPS><CR><LF>

## 5.2 Custom Transmit

Parameters, ASCII text, and control codes are the elements of a custom transmit.

### Parameters

Certain parameters related to weight, quantity, setpoints, ID and status could be sent out of the comm port. Gross Weight, Target 1 and Quantity are examples of printable parameters.

### ASCII Text

ASCII text can be entered into a custom transmit to provide further detail of a transaction. "P", "@" and "+" are examples of ASCII text.

### Control Codes

You can custom transmit ASCII control codes to control a printing device. <CR> (carriage return) and <FF> (form feed) are examples of control codes. When entering a control code in a custom transmit table, use three digits preceded by a decimal point. Example: Start of Text <STX> = 2. Key in [.002].

### 5.2.1 Writing A Custom Transmit ASCII Text File

Any text editor may be used to construct a custom transmit (Notepad, Wordpad, Communication Plus, etc.), but you must save the custom transmit as a text (.txt) file. Instructions can also be sent keystroke by keystroke from a communications program. To do so, ignore the Model 350/355 display and enter the characters in the correct order. Figure 5.1 shows a custom transmit written in Wordpad.

### 5.2.2 Access Setup and Clearing Existing Custom Transmit

Every custom transmit file must start with:

1999%s%s%z%p%u%e
%c%e

This accesses the Setup Mode at the end of the existing transmit and then clears the transmit so that a new one may be entered.

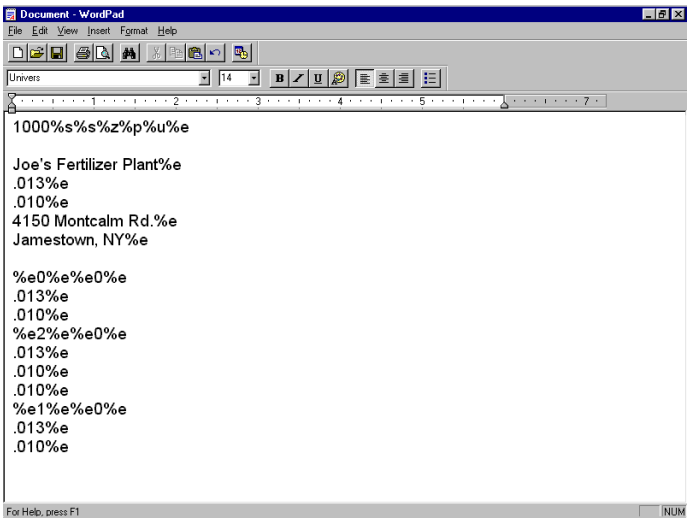



**Figure 5.1 Custom Transmit File**

### 5.2.3 Entering ASCII Text

ASCII text is defined as printable characters, including alpha-numeric as well as punctuation and symbols. See Table 5.1 for a complete listing of ASCII characters. ASCII text can be entered directly into a custom transmit with a %e (enter command). For example, Joe's Fertilizer Plant%e

**Table 5.1 ASCII / Hexadecimal Conversion Chart.**

| hex | CHAR | dec | hex | CHAR | dec | hex | CHAR | dec | hex | CHAR | dec | hex | CHAR | dec |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 00 | **NUL** | 000 | 1A | **SUB** | 026 | 34 | **4** | 052 | NE | **N** | 078 | 68 | **h** | 104 |
| 01 | **SOH** | 001 | 1B | **ESC** | 027 | 35 | **5** | 053 | 4F | **O** | 079 | 69 | **i** | 105 |
| 02 | **STX** | 002 | 1C | **FS** | 028 | 36 | **6** | 054 | 50 | **P** | 080 | 6A | **j** | 106 |
| 03 | **ETX** | 003 | 1D | **GS** | 029 | 37 | **7** | 055 | 51 | **Q** | 081 | 6B | **k** | 107 |
| 04 | **EOT** | 004 | 1E | **RS** | 030 | 38 | **8** | 056 | 52 | **R** | 082 | 6C | **l** | 108 |
| 05 | **ENQ** | 005 | 1F | **US** | 031 | 39 | **9** | 057 | 53 | **S** | 083 | 6D | **m** | 109 |
| 06 | **ACK** | 006 | 20 | **SP** | 032 | 3A | **:** | 058 | 54 | **T** | 084 | 6E | **n** | 110 |
| 07 | **BEL** | 007 | 21 | **!** | 033 | 3B | **;** | 059 | 55 | **U** | 085 | 6F | **o** | 111 |
| 08 | **BS** | 008 | 22 | **"** | 034 | 3C | **<** | 060 | 56 | **V** | 086 | 70 | **p** | 112 |
| 09 | **HT** | 009 | 23 | **#** | 035 | 3D | **=** | 061 | 57 | **W** | 087 | 71 | **q** | 113 |
| 0A | **LF** | 010 | 24 | **$** | 036 | 3E | **>** | 062 | 58 | **X** | 088 | 72 | **r** | 114 |
| 0B | **VT** | 011 | 25 | **%** | 037 | 3F | **?** | 063 | 59 | **Y** | 089 | 73 | **s** | 115 |
| 0C | **FF** | 012 | 26 | **&** | 038 | 40 | **@** | 064 | 5A | **Z** | 090 | 74 | **t** | 116 |
| 0D | **CR** | 013 | 27 | **'** | 039 | 41 | **A** | 065 | 5B | **[** | 091 | 75 | **u** | 117 |
| 0E | **SO** | 014 | 28 | **(** | 040 | 42 | **B** | 066 | 5C | \ | 092 | 76 | **v** | 118 |
| 0F | **SI** | 015 | 29 | **)** | 041 | 43 | **C** | 067 | 5D | **]** | 093 | 77 | **w** | 119 |
| 10 | **DLE** | 016 | 2A | * | 042 | 44 | **D** | 068 | 5E | **^** | 094 | 78 | **x** | 120 |
| 11 | **DC1** | 017 | 2B | **+** | 043 | 45 | **E** | 069 | 5F | _ | 095 | 79 | **y** | 121 |
| 12 | **DC2** | 018 | 2C | **'** | 044 | 46 | **F** | 070 | 60 | ` | 096 | 7A | **z** | 122 |
| 13 | **DC3** | 019 | 2D | **-** | 045 | 47 | **G** | 071 | 61 | **a** | 097 | 7B | **{** | 123 |
| 14 | **DC4** | 020 | 2E | . | 046 | 48 | **H** | 072 | 62 | **b** | 098 | 7C | \| | 124 |
| 15 | **NAK** | 021 | 2F | / | 047 | 49 | **I** | 073 | 63 | **c** | 099 | 7D | **}** | 125 |
| 16 | **SYN** | 022 | 30 | **0** | 048 | 4A | **J** | 074 | 64 | **d** | 100 | 7E | **~** | 126 |
| 17 | **ETB** | 023 | 31 | **1** | 049 | 4B | **K** | 075 | 65 | **e** | 101 | 7F | **DEL** | 127 |
| 18 | **CAN** | 024 | 32 | **2** | 050 | 4C | **L** | 076 | 66 | **f** | 102 | | | |
| 19 | **EM** | 025 | 33 | **3** | 051 | 4D | **M** | 077 | 67 | **g** | 103 | | | |

*Most printers require a carriage return (.013) and/or a line feed (.010) to print preceding data and avoid leaving data in the printer buffer.*

## 5.2.4 Parameter Selection Numbers

The following sequence enters parameters into a custom transmit: %e, the parameter number, %e%e , a format code, and then %e%e with no intervening spaces.

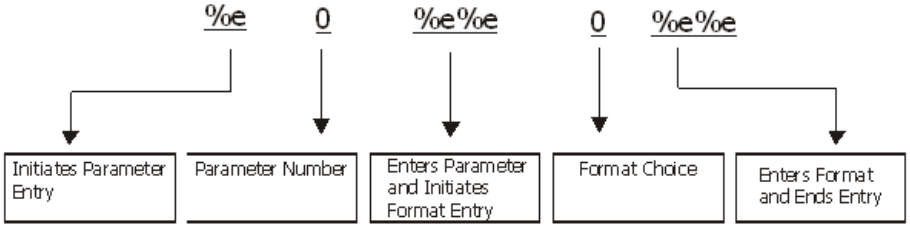



**Table 5.2 Custom Transmit Parameter Selection Numbers**

| Parameter Name | Parameter Number | Sample Print Output |
|---|---|---|
| Gross Weight | 0 | 27.49 lb Gross |
| Net Weight | 1 | 14.53 lb Net |
| Tare Weight | 2 | 12.96 lb Tare |
| Time / Date | 11 | 10:01:01 am 01/26/01 |
| ID | 21 | ID: 12MN53 |
| Quantity | 30 | 58 Qty |
| APW | 34 | 0.25 lb APW |
| APW * K | 35 | 250 lb APW * K |
| Targ1 | 60 | 400 lb Targ1 |
| Targ2 | 64 | 500 lb Targ2 |
| Targ3 | 66 | 1000 lb Targ3 |
| Act 1 (note: Indp. SP1) | 70 | 600 lb Act 1 |
| Rst 1 (note: Indp. SP1) | 71 | 10 lb Rst 1 |
| Act 2 (note: Indp. SP2) | 72 | 300 lb Act 2 |
| Rst 2 (note: Indp. SP2) | 73 | 10 lb Rst 2 |
| Act 3 (note: Indp. SP3) | 74 | 100 lb Act 3 |
| Rst 3 (note: Indp. SP3) | 75 | 5 lb Rst 3 |
| Setpoint Status | 96 | Setpt 0 |
| Stability Status | 97 | Stat M |
| Displayed Value | 98 | 16.34 lb Gross |

### 5.2.5 Format Codes

The default format code for all parameters is 0. This prints all numeric data with 8 characters, right justified, left spaces filled, the units (if applicable) and the parameter name. The format choices for all parameters (except Stability Status and Setpoint Status) are shown in the following table.

| Choice | Sample Print Result | Description |
|---|---|---|
| Weight Parameter Format Codes | | |
| 0 | "  27.49 lb Gross" | Fixed width (8 characters), right justified, left spaces filled. |
| 1 | "000027.49 lb Gross" | Fixed width (8 characters), right justified, left zeroes filled. |
| 2 | "27.49  lb Gross" | Fixed width, left justified, right spaces filled. |
| 3 | "27.49 lb Gross" | Minimum possible width. |
| 8 | "400. lb Net" | Print decimal point, even if data has no fractional portion. |
| 16 | "+400 lb Net" | Print "+" for positive numbers. |
| 32 | "336.52 Net" | Do NOT print parameter units (lb or kg). |
| 64 | "336.52 lb Net" | Print value in "default" units (as opposed to current viewed units). |
| 128 | "336.52 lb" | Do NOT print parameter name. Only Format Code that applies to ID |
| Time / Date Format Codes | | |
| 1 | "10:07:40 am 10/26/09 | Includes seconds with time. |
| 2 | "10:08 10/26/09" | 24 hour time format. |
| 4 | "10:11 am Oct 26, 2009" | Print date spelled out. |
| 8 | "10:12 am Fri 01/26/01" | Print day of the week. |
| 16 | "10:12 am 26/10/09" | International date format. |
| 32 | "980503984 Tm/Dt" | # of seconds since 12:00 AM Jan 1, 1970. |
| 64 | "10/26/09" | Do NOT print time. |
| 128 | "10:14 am" | Do NOT print date. |

## 5.3 ID Number Entry and Printing

It is possible to enter an ID number and have the number print out on a ticket. This mode is accessed from the weigh mode by entering [21] [SELECT]. The first six digits of the existing ID number will be displayed. An alphanumeric ID of up to 50 characters can be entered. At this point a new ID number can be entered or the existing number may be cleared.

In order for the ID number to be printed, the following criteria must be met.

- P210 or P230 must be set to ID. If the desired parameter(s) is set to another value, the indicator will not prompt for an ID entry.
- P213 or P233 must be set for cust. If the parameters are not set for custom, the ID will not be printed.
- P1000 or P2000 must contain parameter 21 (ID).

### 5.3.1 Enter an ID from the weigh mode:

1. Press the [PRINT] key from the weigh mode. The display will show the current ID number if one has been entered previously.
2. Key in the desire ID number (numeric and/or alphanumeric) and press [TARE] (Model 350) or [ENTER] (Model 355). This will print a ticket.

   or

2a. If the ID number shown is acceptable simply press [TARE] (Model 350) or [ENTER] (Model 355). This will print a ticket.

## 5.4 Remote Serial Operation

Perform different keypresses via communication port.

**Table 5.3 Remote Serial Operation**

| Command | ASCII | Hexidecimal | Description |
|---|---|---|---|
| Print | %p | F0h | Initiates print function. Print restrictions (P200 - P233) will be adhered to. |
| Select | %s | F3h | Performs a parameter or mode select operation. |
| Tare | %t | F4h | Initiates tare function. Tare restrictions (P161 - P169) will be adhered to. |
| Units | %u | F5h | Toggles between displayed units of measure. |
| Zero | %z | FAh | Initiates zero function. Zero restrictions (P118) will be adhered to. |
| Enter | %e | E5h | Enters preceding data into selected register. Also toggles through selections in Setup Mode. |

| Command | ASCII | Hexidecimal | Description |
|---|---|---|---|
| Piece Wt. Entry | %9 | B9h | Allows a piece weight to be entered serially. For example, 0.10%9 will enter a piece weight of 0.10. |
| Print W<CR> or P<CR> | W<CR> | 57h, 0Dh | Initiates print function. Print restrictions (P200-P212) will be adhered to. Requires both hex values, 57h followed by 0Dh. |
| Zero | Z<CR> | 5Ah, 0Dh | Initiates zero function. Zero restrictions (118) will be adhered to. Requires both hex values, 5Ah followed by 0Dh. |
| *<CR> is a carriage return, decimal value 013, hex value 0Dh.* | | | |

### 5.4.1 Display Capture Utility

The Display Capture Utility sends the current display information out of the one of the available comm ports when the one of the two extended ASCII character represented by decimal 149 (hex: 95h) or decimal 150 (hex: 96h) are received through the comm port. The previous characters can be used when the comm. port is set to 8 data bits. For 7 data bits comm. port, %[Ctrl-U] or %[Ctrl-V] can be used to replace 149 or 150 respectively. Upon receiving decimal 149, the Display Capture Utility sends the current display information out of comm. port 1. Upon receiving decimal 150, the Display Capture Utility sends the current display information out of comm. port 2. Entering a decimal 149 from a computer keyboard can be accomplished by turning on the Num Lock and holding down the ALT key while typing the desired decimal number on the keyboard keypad (for example, <Alt>149).

*The Display Capture Utility must have NTEP (P440) disabled in order to function.*

***Example #1***

The scale is in the weigh mode with the gross weight displayed (for example, 15.00).

Input: The extended ASCII character represented by decimal 149 (hex: 95h) is received through any comm port.

Output: "15.00 lb Gross " is sent out comm port 1.

***Example #2***

The scale is in setup at P110 Full Scale.

Input: The extended ASCII character represented by decimal 150 (hex: 96h) is received through any comm port.

Output: "P110 F.S. 100.00 " is sent out comm port 2.

## 5.5 RS-485 Multi-Drop Network Setup and Operation

The RS-485 multi-drop network option supports both half duplex (2- wire) and full duplex (4-wire) modes of operation. The mode of operation is determined by setting jumpers 1-4 on the RS-485 option board.

**Table 5.4 RS-485 Network Parameters**

| Parameter Setting | Displayed Name | Description | Type/choices (*=default) |
|---|---|---|---|
| P250.00 | rS485 | Enable or disable RS-485 network option. | Disbl*, Enabl |
| P251.00 | Addr | Specifies the address of the controller for RS-485Multi-Drop communications. | Numeric Entry:Disabled (0*) and 4 - 254 |

**Table 5.5 RS-485 Mode of Operation**

| Jumper | Half Duplex | Full Duplex | Description |
|---|---|---|---|
| 1 | Installed | Open | Selects half or full duplex |
| 2 | Installed | Open | |
| 3 | Installed on the endpoints of the network | Installed on the endpoints of the network | Termination resistor (R8 - 121) |
| 4 | Installed | Open | Receiver disabled when transmitting (if installed) |

### 5.5.1 Setup

The Model 350/355 controller supports address recognition, which allows a single master device to communicate with up to 250 distinct slave controllers. P250 must be enabled in order to gain access to P251. Enabling P250 by itself only causes the RTS line to become a driver enable for the RS-485 network option. Changing the P251 address to a value of 4 - 254 enables the network address recognition receive feature (i.e. networking).

### 5.5.2 Operation

When P251 is enabled by choosing a valid address, the Model 350/355 will ignore all data it receives until an <STX> character is followed immediately by a character that matches the address defined by setup parameter P251. If these two conditions are met then the Model 350/355 will process all subsequent data until the end of block character, <ETX>, is received, signaling the end of the transmission. The receive routine of the Model 350/355 then resets to look for the <STX> character again.

The data packet format recognized by the Model 350/355 is defined as follows:

<STX><ADDRESS><DATA><DATA><DATA><DATA>…<ETX>

Refer to Table 5.1, *ASCII / Hexadecimal Conversion Chart.* on page 85 for <STX > and <ETX> ASCII codes. The address is a single byte decimal value (4 - 254). The <DATA> can be any information recognized by the Model 350/355, including direct commands - such as a %p (Print). This would direct the addressed unit to send its print transmission defined at P213 over the network.

If the received address character does not match P251 then all of the subsequent data is ignored until the next start of packet character,<STX>, is received.

An address of 0 at P251 will cause the Model 350/355 to process all received data.

### 5.5.3 Network Protocol

The protocol settings for the RS-485 network option board are the same as the protocol settings for RS-232. These settings are found starting at parameter P200. All devices connected to the network must have matching protocol settings.

## 5.6 Parts Counting

The counting parameter must be enabled before using. Follow the instructions below for sampling and counting parts. A new sample must be performed for each unique part being counted. The indicator will not store the average piece weight.

Parameter (P170) must be enabled before parts counting is accessible. See page 63 for details on selecting a specific parameter.

### 5.6.1 Model 350

#### Sample selectable fixed counts from the weigh mode

1. From the weigh mode, press [SELECT] until the QTY annunciator is lit. The display may show *do APS* if an average piece weight is not found. This message is to let you know this is a new sample. Go to step 2.
2. Press [TARE] to perform a sample. *Add 10* will be displayed. If 10 is the desired sample size, go to step 4. Otherwise go to step 3.
3. If a fixed sample size other than 10 is desired, press [SELECT] to toggle through sample size choices 5, 10, 20, 50 and 100. When the desired sample size is displayed, go to step 4.
4. Add the pieces to be sampled and press [TARE]. After motion is stabilized, the sampled quantity will be displayed.
5. Continue adding parts to be counted. The display will show the number of parts added.

5a. If a different part needs to be counted, go to step 2.

#### To sample using variable counts

1. From the weigh mode, press [SELECT] until the QTY annunciator is lit. The display may show *do APS* if an average piece weight is not found. This message is to let you know this is a new sample. Go to step 2.
2. Press [TARE] to perform a sample. *Add 10* will be displayed.
3. Add pieces and key in the number of pieces being sampled by entering the known sample size. First press the [PRINT] key until the first digit is displayed. Use the [UNITS] key to move to the next digit. Continue using the [PRINT] and [UNITS] keys until the desired sample size is displayed and press [TARE].
4. Add the pieces to be sampled and press [TARE]. After motion is stabilized, the sampled quantity will be displayed.
5. Continue adding parts to be counted. The display will show the number of parts added.

5a. If a different part needs to be counted, go to step 2.

#### View the average piece weight

1. From the QTY mode, press [SELECT] once. The display will show *APS* and then flash the last sampled average piece weight. This value cannot be altered.

2. Press the [SELECT] key to exit the average piece weigh mode. Continue to press [SELECT] until the desire weigh mode parameter is displayed.

### 5.6.2 Model 355

#### To sample using selectable fixed counts from the weigh mode

1. From the weigh mode press [ENTER]. *Add 10* will be displayed. If 10 is the desired sample size, go to step 3. Otherwise go to step 2.

1a. If a fixed sample size other than 10 is desired, press [SELECT] or [UNITS] to toggle through sample size choices 5, 10, 20, 50 and 100. When the desired sample size is displayed, go to step 3.

2. Add the pieces to be sampled and press [ENTER]. After motion is stabilized, the sampled quantity will be displayed.

3. Continue adding parts to be counted. The display will show the number of parts added.

3a. If a different part needs to be counted, go to step 2.

#### To sample using variable counts

1. From the weigh mode press [ENTER]. *Add 10* will be displayed.

1a. If 10 is the desired sample size, go to step 3. Otherwise go to step 2.

2. Add pieces and key in the number of pieces being sampled with the numeric keys. Press [ENTER] to accept the entry.

3. Add the pieces to be sampled and press [ENTER]. After motion is stabilized, the sampled quantity will be displayed.

4. Continue adding parts to be counted. The display will show the number of parts added.

4a. If a different part needs to be counted, go to step 2.

#### View the average piece weight

1. From the QTY mode, press [SELECT] once. The display will show *APS* and then flash the last sampled average piece weight. This value cannot be altered.

2. Press the [SELECT] key to exit the average piece weigh mode. Continue to press [SELECT] until the desire weigh mode parameter is displayed.

## 5.7 Set Time & Date

The time and date feature is stored as non-volatile (time/date setting will not be lost when the unit power is reset). The time/date parameter is available in the first two fixed transmits (See Transmit Selection on page 74) and can be included in a custom transmit (See Custom Transmit Setup on page 78).

The time and date can be accessed from the weigh mode with the [SELECT] key if P502 is enabled. Also 11%s can be sent into the comm port to access the time/date entry regardless of P502. The time and date can be entered in the setup mode at P500 and P501. Access P500 to change the time or P501 to change the date. To access the setup mode see page 61. Use the instructions below to enter the time and/or date. Refer to page 66 to save the time and date and exit to the weigh mode.

## 5.7.1 Model 350

### To enter the time from the Enter~tine~00.00.00 prompt

EXAMPLE: 16.32.41 (4:32:41 P.M.)

1. Press [PRINT] to toggle through the numbers to enter the hour. Hours must be entered as military time.
2. Press [UNITS] once to move the cursor. Press [PRINT] to select the next digit.
3. Press [UNITS] twice to move the decimal point over to separate the hour from the minutes. It is not necessary to enter a 0 before a single digit hour.

### To enter the date from the Enter~date~01.01.70 prompt

EXAMPLE: 01.09.09 (January 9, 2009)

1. Press [PRINT] to toggle through the numbers to enter the month.
2. Press [UNITS] twice to move the decimal point over to separate the month from the day. It is not necessary to enter a 0 before a single digit month. If it is a double-digit entry, press [UNITS] once to move the cursor and then [PRINT] to scroll through the digits.
3. Press [PRINT] to toggle through the numbers to enter the day.
4. Press [UNITS] twice to move the decimal point over to separate the day from the year. It is not necessary to enter a 0 before a single digit month. If it is a double-digit entry, press [UNITS] once to move the cursor and then [PRINT] to scroll through the digits.
5. Press [PRINT] to toggle through the numbers to enter the year.
6. Press [UNITS] once to move the cursor and then press [PRINT] to scroll through the digits.
7. Press [TARE] twice to accept the entry.

## 5.7.2 Model 355

### To enter the time from the Enter~tine~00.00.00 prompt

EXAMPLE: 16.32.41 (4:32:41 P.M.)

1. Key in the date in the following format: 16.32.41
2. Press [ENTER] to except the time and move to the weigh mode.

**To enter the date from the Enter~date~01.01.70 prompt**

EXAMPLE: 01.09.09 (January 9, 2009)

1. Key in the date in the following format: 1.9.9. It is not necessary to enter a 0 before a single digit month.
2. Press [ENTER] to except the date and move to the time entry. Press [ENTER] again to bypass the time entry.

## 5.8 Remote Key Setup

The Model 350 and Model 355 have four selectable remote key operations to choose from: Print, Tare, Zero and Print/Tare. Only one of these operations may be assigned to the remote key input. Table 5.6 describes the available remote key operations. See Remote Key Connection on page 24 for information on connecting a remote key input device.

**Table 5.6 Remote Key Operations**

| Remote Key Selection | Function | Description |
|---|---|---|
| P800.00 | None | Remote key disabled. |
| P800.01 | Print | Initiates print function. Print restrictions (P200 - P212) will be adhered to. |
| P800.02 | Tare | Initiates tare function. Tare restrictions (P161 - P169) will be adhered to. |
| P800.03 | Zero | Initiates zero function. Zero restrictions (P118) will be adhered to. |
| P800.04 | Print and Tare | Initiates print function and then tare function. (P200 - P233) will be adhered to. Also (P161 - P169) will be adhered to. |

*Tare, Zero and Print functions will be delayed according to the stability setting (P114). If a setpoint operation is configured to use the remote key as an activation method, the P800 setting is over-ridden.*

## 5.9 Upgrade Indicator Firmware

The Model 350 and Model 355 have flash memory on the main board where the parameters are stored. It is possible to update the firmware simply by using a computer. The firmware is loaded into a flash memory IC. This allows for ease in loading firmware updates.

*The flash memory on the main processor is only rated to be reflashed up to 10 times under extreme industrial and temperature conditions.*

### 5.9.1 Prepare For Upgrade

Before the indicator firmware can be updated, the procedure below must be followed. A computer with a serial port or USB port is required for loading a flash file. If you are using a USB port, a USB to serial converter is necessary.

1. Connect the communication cable from the computer to comm 1 of the Model 350 or Model 355.
2. Open a communications program or terminal window program (such as Communication Plus) on the computer.
3. Set the protocol of the indicator to be 9600 baud, 1 stop bit, no parity.
4. Set the computer protocol to be 9600 baud, 1 stop bit, no parity.
5. Go to parameter 65020 (re-flash) and press [TARE] (350) or [ENTER] (355). Press [TARE] (350) or [ENTER] (355) at the "ARE YOU SURE ? prompt. Press [TARE] (350) or [ENTER] (355) at the Enter = Flash prompt.

   or

   Unplug the indicator and move Reflash jumper (E2) from NORMAL to RFLASH.
6. The terminal program should show:

   GSE Scale Systems
   300 Series Bootloader Version XX (where XX should be at least 03)
   Date (where Date should be at least Feb 2004)
   a.Erase Flash
   b.Program Flash
   c.Set Baud Rate
   d.Quit
7. Set the indicator baud rate in the terminal software to the desired baud rate by entering c from the computer keyboard. Set the baud rate in the terminal program to match the baud rate chosen for the indicator. See the table below for baud rates and time for upload.

| Baud Rate | Approximate Upload Time |
|---|---|
| 9600 | 10 - 15 minutes |
| 38400 | 2 - 5 minutes |
| 57600 | 1 - 3 minutes |

### 5.9.2 Load Flash File

1. The current flash file must be erased. Enter an a from the computer keyboard. When finished the menu choices will be replicated.
2. To program flash, enter a b from the computer keyboard. Open the flash file from your terminal window and send it to the indicator. After the file loads the menu choices will be replicated.
3. To end the flash process, enter a d from the computer keyboard to quit. The indicator will restart.

4. If the Reflash jumper (E2) was set to REFLASH, unplug the indicator and return the jumper to the NORMAL position.

5. In order to enable the Model 355 keypad you must cycle power and hold the [ENTER] key on power up.

5a. If Ch#### is displayed after reflashing then the reflash failed. Use the reflash jumper to force reentry into reflash menu and reprogram again.

## 5.10 Remote Display Configuration

The remote display function allows a master indicator (350 or 355) to be echoed to another indicator (350 I.S., 355 I.S., 355) and be used in a remote location. There are certain parameters that must be set in order to have the master and slave indicators communicate together. Refer to the section below to configure the master and remote (slave) indicators.

*The master does not transmit any information to the hub unless there is something new to report such as a change in weight, keypress, etc*

### 5.10.1 Master to Remote (Slave) Configuration

The remote indicator will receive continuous transmission from the master indicator. It is necessary to setup the protocol parameters in both indicators so they match in order to coordinate the transmission. See table below for the common protocol parameters. A remote indicator will not show the bargraph even if it is a LCD display.

| Master | Remote | Parameter Description |
|---|---|---|
| P200 or P220 | P200 or P220 | Baud rate |
| P201 or P221 | P201 or P221 | Data bits |
| P202 or P222 | P202 or P222 | Parity |
| P203 or P223 | P203 or P223 | Stop bits |
| P204 or P224 | P204 or P224 | Handshaking |
| P291 | P274 | Start Character |
| P292 | P275 | End Character |

#### To enter the master or remote setup (local setup)

It is possible to make changes to the master indicator setup mode from either the remote indicator or the master indicator itself. The master indicator setup mode can be entered from either the master or the remote indicators. However, the remote indicator (slave) setup mode can ONLY be entered from the remote indicator. After in the setup mode, you can make changes from the remote indicator or the master indicator. Refer to page 61 for instructions on how to access the setup mode.

After the setup mode is entered, the numeric portion on the 355 keypad is restored. When in the remote (slave) setup, all annunciators are illuminated on the remote to distinguish between the master and remote (slave) indicators.

### 5.10.2 Setup Master Indicator

Set the following parameters on the master indicator:

- P290 - Choose the communication port of the master indicator the remote indicator is connected to.
- P291 - Transmit any ASCII character or control code to the remote indicator as a start character before echoing unit's display. Make sure this parameter matches P274 on the remote indicator.
- P292 - Transmit any ASCII character or control code to the remote indicator as an ending character after echoing unit's display. Make sure this parameter matches P275 on the remote indicator.
- P296 - Choose the remote indicator type, a 300 series or 60 series.

### 5.10.3 Setup Remote Indicator

For an indicator to become a remote display P260 must be set for r-dsp. There are two styles in which the remote indicator will display data received from the master indicator. These styles are display and custom. Choose one of the display styles at P271. Refer to page 100 for details on display and custom styles.

The parameters in the following table are available only when P260 is set for r-dsp or Hub.

**Table 5.7 Remote Display Setup Parameters**

| Parameter Setting | Displayed Name | Description | Type / choices (*=Default) |
|---|---|---|---|
| P261.01 | R-port | Choose the port in which the remote display (slave) will communicate with the master device. | 1*, 2, None |
| P270.00 | T-out | Determines whether the remote display (slave) will show a message when connection is lost. | Enable / Disable* |
| P271.00 | Style | Set to display or custom. When set to display the remote will echo the display of the master indicator. When set to custom the remote receives a custom format from the master indicator. In custom mode the transmit may be send continuous or on demand. | Display* / Custom |
| P272.00 | Addr | Set address for remote display. Only present if P271 is set for custom. | None*, 1-255 |
| P273.01 | T-use | Determines where transmits sent out the comm. port from the master or control indicator that is connected to the remote or hub are redirected to. Should not be set to the same port as P261 unless transmit wire is being used to connect to a printer connected to the remote indicator (In this case the keypad cannot be used to talk to the master or control indicator). | None*, Port 1, Port 2 |
| P274.02 | Start | Set the start character for the remote display. Choices are 0 - 255. Default value is 2 (STX). The choice must match the start character in P291 on the master display. Avoid using values of 17 or 19 when using software flow control. The values of 17 and 19 are Xon and Xoff codes and could cause conflict. | Numeric Entry: 0 to 255 2* |

| Parameter Setting | Displayed Name | Description | Type / choices (*=Default) |
|---|---|---|---|
| P275.03 | End | Set the end character for the remote display. Choices are 0 - 255. Default value is 3 (ETX). The choice must match the end character in P292 on the master display. Avoid using values of 17 or 19 when using software flow control. The values of 17 and 19 are Xon and Xoff codes and could cause conflict. | Numeric Entry: 0 to 255 3* |
| P276.01 | Rptin | Allow or disallow data received from the remote display's (slave) communication port to be sent to the master. | Enable* / Disable |
| P277.01 | R-start | Enables or disables the use of the [START] key on the master indicator. When this parameter is enabled and the key is pressed, a start key command will be recognized by the master indicator. The Tx, Rx and GND line must be connected between the COMM Ports of the master and remote unit. If this parameter is disabled the [START] key will have no effect on the master indicator. | Enable* / Disable |
| P278.01 | R-stop | Enables or disables the use of the [STOP] key on the master indicator. When this parameter is enabled and the key is pressed, a stop key command will be recognized by the master indicator. The Tx, Rx and GND line must be connected between the COMM Ports of the master and remote unit. If this parameter is disabled the [STOP] key will have no effect on the master indicator. | Enable* / Disable |
| P280.01 | Zero | Enables or disables the use of the [ZERO] key on the master indicator. When this parameter is enabled and the key is pressed, a Zero key command will be recognized by the master indicator. The Tx, Rx and GND line must be connected between the COMM Ports of the master and remote unit. If this parameter is disabled the [ZERO] key will have no effect on the master indicator. | Enable* / Disable |
| P281.01 | Units | Enables or disables the use of the [UNITS] key on the master indicator. When this parameter is enabled and the key is pressed, a Units key command will be recognized by the master indicator. The Tx, Rx and GND line must be connected between the COMM Ports of the master and remote unit. If this parameter is disabled the [UNITS] key will have no effect on the master indicator. | Enable* / Disable |
| P282.01 | Select | Enables or disables the use of the [SELECT] key on the master indicator. When this parameter is enabled and the key is pressed, a Select key command will be recognized by the master indicator. The Tx, Rx and GND line must be connected between the COMM Ports of the master and remote unit. If this parameter is disabled the [SELECT] key will have no effect on the master indicator. | Enable* / Disable |
| P283.01 | Prtut | Enables or disables the use of the [PRINT] and [UNITS] keys on the master indicator (350). When this parameter is enabled and the keys are pressed, the Print and Units keys will be simulated. The Tx, Rx and GND line must be connected between the COMM Ports of the master and remote unit. If this parameter is disabled the keys will have no effect on the master indicator. | Enable* / Disable |
| P284.01 | Print | Enables or disables the use of the [PRINT] key on the master indicator. When this parameter is enabled and the key is pressed, a Print key command will be recognized by the master indicator. The Tx, Rx and GND line must be connected between the COMM Ports of the master and remote unit. If this parameter is disabled the [PRINT] key will have no effect on the master indicator. | Enable* / Disable |
| P285.01 | Tare | Enables or disables the use of the [TARE] key on the master indicator. When this parameter is enabled and the key is pressed, a Tare key command will be recognized by the master indicator. The Tx, Rx and GND line must be connected between the COMM Ports of the master and remote unit. If this parameter is disabled the [TARE] key will have no effect on the master indicator. | Enable* / Disable |

| Parameter Setting | Displayed Name | Description | Type / choices (*=Default) |
|---|---|---|---|
| P286.01 | Enter | Enables or disables the use of the [ENTER] key on the master indicator. When this parameter is enabled and the key is pressed, an Enter/Sample key command will be recognized by the master indicator. The Tx, Rx and GND line must be connected between the COMM Ports of the master and remote unit. If this parameter is disabled the [ENTER] key will have no effect on the master indicator. | Enable* / Disable |
| P287.01 | Clear | Enables or disables the use of the [CLR] key on the master indicator. When this parameter is enabled and the key is pressed, a clear key command will be recognized by the master indicator. The Tx, Rx and GND line must be connected between the COMM Ports of the master and remote unit. If this parameter is disabled the [CLR] key will have no effect on the master indicator. | Enable* / Disable |
| P288.01 | Digit | Enables or disables the use of the numeric keys on the master indicator including the decimal key. When this parameter is enabled and a numeric key is pressed, it will be recognized by the master indicator. The Tx, Rx and GND line must be connected between the COMM Ports of the master and remote unit. If this parameter is disabled the numeric keys will have no effect on the master indicator. | Enable* / Disable |

### Display (P271)

When set for Display, information will be displayed on the remote indicator exactly as it appears on the master indicator.

Set P271 for Display and configure all other remote display parameters. Configure the parameters in the master indicator (refer to Setup Master Indicator on pages 97). Make sure that the wiring connections between the master and remote indicators are correct (refer to Remote Display Connections on page 25.

### Custom (P271)

When set for Custom, the master indicator will send customized information to be displayed on the remote indicator.  A parameter or text data may be transmitted to the remote indicator on a continual or "on demand" basis.

Set P271 for Custom and set all other remote display parameters (refer to Table 5.7). Configure the parameters in the master indicator (refer to Setup Master Indicator on page 97). Make sure that the wiring connections between the master and remote indicators are correct (refer to Remote Display Connections on page 25. Follow the instructions below for configuring the master indicator.

1. Turn echo off at P290.
2. Set the transmit to be continuous at P210 (port 1) or P230 (port 2). This is the port going to the remote indicator.
3. Program custom transmit in the master indicator at P1000 (port 1) or P2000 (port 2). See the example below for instructions on programming a custom transmit.

*If time out is enabled (P270), then the transmit should be set for continuous at P210 or P230 and have stability disabled at P212 or P232*

### Example:

The master indicator will be active and the Net weight will be displayed on the remote indicator. The net and lb annunciators will illuminate. The codes for the annunciators will be entered as they are control codes (see Entering ASCII Control Codes on page 84. The address of the remote indicator at P272 is 4. If P272 is set to None!, do not enter anything for the address field.

Access custom transmit 1 (P1000) or custom transmit 2 (P2000).

***Format String:***

If P274 and P275 = 1 - 255

<Start Character>, <Address>, <Annunciator 1>, <Annunciator 2>, <Parameter>, <End Character>

or

If P274 or P275 = 0

<Address>, <Annunciator 1>, <Annunciator 2>, <Parameter>, <Line Feed>

***Custom Transmit :***

1. [.002] [ENTER] or [TARE] - <Start Character>
2. [.004] [ENTER] or [TARE] - <Address>
3. [.016] [ENTER] or [TARE] - <Annunciator 1>
4. [.064] [ENTER] or [TARE] - <Annunciator 2>
5. [ENTER] or [TARE], [1], [ENTER] or [TARE], [160], [ENTER] or [TARE] - <Net Parameter>
6. [.003] [ENTER] or [TARE] - <End Character>
7. Save changes and exit the setup mode.

| ASCII Code | 128 | 64 | 32 | 16 | 8 | 4 | 2 | 0 |
|---|---|---|---|---|---|---|---|---|
| Annunciator 1 | | Good2 | Gross | Net | Qty | Other | kg | |
| Annunciator 2 | | lb | Spt 1 | Spt 2 | Spt 3 | >0< | Motion | |

The start character and end character can be any ASCII character 1 - 255. Refer to the above table for the annunciator codes to be entered in the custom transmit. Always use 160 for the format code when entering a parameter.

## 5.11 Hazardous Area to Safe Area Configuration

In order to use setpoints or analog output modules they must be located in the safe area. These modules will be installed in the safe area hub. Refer to Safe Area Setpoint Option Installation or Safe Area Analog Option Installation on page 33 for option installation instructions. The control indicator will be in the hazardous area and where the load cell(s) will be connected. The control and hub indicators will communicate via fiber optic cable. Refer to Fiber Optic Interface on page 38 for installation instructions.

Use the following instructions to setup the control and hub indicators. Once a control or hub indicator is chosen at P260, the protocol and interactive parameters are automatically set up. See Table 5.8 for the default parameters of the control and hub. The setpoint and analog output parameters are only set in the control indicator (refer to Setpoint Setup on page 105 or Analog Output Setup on page 131). The hub indicator will echo the control indicator.

Make sure the controller and hub are connected with the fiber-optic kit and fiber-optic cable. Setup the hub indicator first and either cycle power or enter then exit the setup mode. This will synchronize P176, P177, P61200 - P61205.

### Simple Setup (Hub Indicator):

1. Set P260 for Hub.
2. Exit the setup mode.

### Simple Setup (Control Indicator):

1. Set P260 for Cntrl.
2. Exit the setup mode.

**Table 5.8 Default Control and Hub Parameters**

| Parameter | Setting | Control / Hub |
|---|---|---|
| P171 | Ignored | hub |
| P220 | Baud Rate - 57600 | control / hub |
| P221 | Data bits - 8 data bits | control / hub |
| P222 | Parity - no parity | control / hub |
| P223 | Stop bit - on stop bit | control / hub |
| P224 | Flow control - Xon / Xoff | control / hub |
| P261 | Receive from control or master - port 2 | hub |
| P270 | Time out - enabled | hub |
| P271 | Echo style - display | hub |
| P272 | Address - none | hub |
| P273 | Transmit non displayed data - port 1 | hub |
| P274 | Start character - 2 | hub |
| P275 | End character - 3 | hub |
| P276 | Pass through to master - enabled | hub |
| P277 | Remote start key - enabled | hub |
| P278 | Remote stop key - enabled | hub |
| P280 | Remote zero key - enabled | hub |
| P281 | Remote units key - enabled | hub |
| P282 | Remote select key - enabled | hub |
| P283 | Remote ID key - enabled | hub |
| P284 | Remote print key - enabled | hub |
| P285 | Remote tare key - enabled | hub |
| P286 | Remote enter key - enabled | hub |
| P287 | Remote clear key - enabled | hub |
| P288 | Remote numeric and decimal key - enabled | hub |
| P289 | Remote target key - enabled | hub |
| P291 | Start character - 2 | control |
| P292 | End character - 3 | control |
| P296 | Remote style - 300 | control |

The parameters of the hub indicator may be overridden by keying in [299] [ENTER] at P260. The parameters of the control indicator may be overridden by keying in [399] [ENTER] at P260. Refer to Table 5.8 for the parameters available for the hub.

Each time the hub indicator is powered up, the display may show Hub. Once motion is seen, the display will echo the control unit. Setpoints and analog outputs on hub are updated within 1 second or on the actual change in state even if hub is showing.

## 5.12 300 Series Command Codes

It is possible to send commands through the serial port to perform specific tasks.

| Hex | Decimal | Symbol | Percent equivalent | Master / Remote | Action |
|---|---|---|---|---|---|
| 0 | 0 | NULL | none | M | As part of an echo used to indicate character information starting at 1st of 10 characters |
| 1 | 1 | SOH | none | M | As part of an echo used to indicate character information starting at 2nd of 10 characters |
| 2 | 2 | STX | none | M | Used to begin an echo OR as part of an echo used to indicate character information starting at 3rd of 10 characters |
| 3 | 3 | ETX | none | M | Normally to end an echo OR as part of an echo used to indicate character information starting at 4th of 10 characters |
| 4 | 4 | EOT | none | M | As part of an echo used to indicate character information starting at 5th of 10 characters. |
| 5 | 5 | ENQ | none | M | As part of an echo used to indicate character information starting at 6th of 10 characters. |
| 6 | 6 | ACK | none | M | As part of an echo used to indicate character information starting at 7th of 10 characters. |
| 7 | 7 | BEL | none | M | As part of an echo used to indicate character information starting at 8th of 10 characters. |
| 8 | 8 | BS | none | M | Backspace OR as part of an echo used to indicate character information starting at 9th of 10 characters. |
| 9 | 9 | HT | none | M | As part of an echo used to indicate character information starting at 10th of 10 characters. |
| A | 10 | LF | none | M | As part of an echo used to indicate numeric display information. |
| D | 13 | CR or CTL-M | none | M | Clear Key (clears user input or can initiate an action). As part of an echo used to indicate annunciator & display toggle scheme information. |
| 11 | 17 | CTL-Q | none | M/R | Xon |
| 13 | 19 | CTL-S | none | M/R | Xoff |
| 81 | 129 | | %[Ctrl-A] | M | Target Key |
| 85 | 133 | | %[Ctrl-E] | M | Start Key |
| 86 | 134 | | %[Ctrl-F] | M | Stop Key |
| 95 | 149 | | %[Ctrl-U] | M | Echo display (all 3 lines) out comm. 1 |
| 96 | 150 | | %[Ctrl-V] | M | Echo display (all 3 lines) out comm. 2 |
| B9 | 185 | | %9 | M | Enters the number before the %9 as the piece weight |
| D0 | 208 | | %P | M | Pause |
| D0 | 208 | | %Q | M | Send out transmits one and two |
| D2 | 210 | | %R | M | Remote Key 2 |
| E0 | 224 | | %' | M | Backward Select |
| E3 | 227 | | %c | M | Clear Key (clears user input or can initiate an action |
| E5 | 229 | | %e | M | Enter Key |

| Hex | Decimal | Symbol | Percent equivalent | Master / Remote | Action |
|---|---|---|---|---|---|
| E9 | 233 | | %i | M | ID Key (Print & Units on 350) |
| EF | 239 | | %o | M/R | Turn off 350. |
| F0 | 240 | | %p | M | Print Key/ Arrow Up Key |
| F2 | 242 | | %r | M | Remote Key 1 |
| F3 | 243 | | %s | M | Select Key |
| F4 | 244 | | %t | M | Tare Key |
| F5 | 245 | | %u | M | Units Key/ Right Arrow Key |
| F6 | 246 | | %v | M/R | Enter Setup |
| F8 | 248 | | %x | M | [Print][Select] Keys - Extended Resolution Gross |
| FA | 250 | | %z | M | Zero Key |

## 5.12.1 Display Capture Utility

The Display Capture Utility sends the current display information out of the one of the available comm ports when the one of the two extended ASCII character represented by decimal 149 (hex: 95h) or decimal 150 (hex: 96h) are received through the comm port. The previous characters can be used when the comm. port is set to 8 data bits. For 7 data bits comm. port, %[Ctrl-U] or %[Ctrl-V] can be used to replace 149 or 150 respectively. Upon receiving decimal 149, the Display Capture Utility sends the current display information out of comm. port 1. Upon receiving decimal 150, the Display Capture Utility sends the current display information out of comm. port 2. Entering a decimal 149 from a computer keyboard can be accomplished by turning on the Num Lock and holding down the ALT key while typing the desired decimal number on the keyboard keypad (for example, <Alt>149).

*The Display Capture Utility must have NTEP (P440) disabled in order to function.*

***Example #1***

The scale is in the weigh mode with the gross weight displayed (for example, 15.00).

Input: The extended ASCII character represented by decimal 149 (hex: 95h) is received through any comm port.

Output: "15.00 lb Gross " is sent out comm port 1.

***Example #2***

The scale is in setup at P110 Full Scale.

Input: The extended ASCII character represented by decimal 150 (hex: 96h) is received through any comm port.

Output: "P110 F.S. 100.00 " is sent out comm port 2.

## 5.13 Setpoint Setup

The Model 350/355 has several pre-programmed scale setpoint applications available at P5100. Various related setpoint parameters may appear according to which of the standard programs is chosen. Table 5.9 describes the available setpoint operations

**Table 5.9 .Setpoint Operations**

| Setpoint Selection Parameter | Function | Description | Page Ref |
|---|---|---|---|
| P5100.00 | None | Setpoints disabled. | -- |
| P5100.01 | ChecP | Percentage check-weighing. Over/Under tolerances are based on a percentage of the target weight. | 108 |
| P5100.02 | Fill | Single Ingredient Fill (Single or Dual-Speed). Allows the use of pre-acts for dribble feed and compensation for free-fall material. Includes a selectable 'learn' mode. | 109 |
| P5100.03 | Batch | Batch up to three ingredients. Allows for the use of pre-acts to compensate for free-fall material. Includes selectable 'learn' modes. | 112 |
| P5100.04 | Dschg | Single Ingredient Discharge (Single or Dual-Speed). Allows the use of pre-acts for dribble feed and compensation for free-fall material. Includes a selectable 'learn' mode. | 115 |
| P5100.05 | Both | Single Ingredient Fill and Discharge. Fill large holding vessels and discharge material in pre-determined amounts. Allows for the use of pre-acts to compensate for free-fall material. Includes a selectable 'learn' mode. | 117 |
| P5100.06 | ChecA | Absolute check-weighing. Over/Under tolerances are based on discrete values. | 120 |
| P5100.07 | Indep | Independent Setpoints. Activation based on specific target values. Includes selectable reset conditions. | 126 |
| P5100.08 | Checb | Target Deviation check-weighing. Over/Under tolerances are deviated from the target weight. | 122 |
| P5100.9 | Btch2 | Batch up to 3 ingredients without preact values | 124 |

Each program utilizes the three annunciators located to the left of the main display to give a visual status of the setpoint. A setpoint option board may be installed in the safe area via Fiber-Optic hub to allow control of an external device.

## 5.13.1 Activation Methods

Setpoint activation for Fill, Batch, Discharge, and Both can be initiated in one of four ways: Tare, Remote, Auto and Start key (355 only). Check-weigh operations have no start function but there are two methods of restarting. See parameter 5004 on page 79 for more details. Independent setpoint operations are limited to Above or Below activation. The Model 350 and Model 355 setpoint option board may be connected in-series with a larger automated control system or a manually activated switching device. A foot switch, a two-hand safety station, or other permissive-start devices may be used for safety or system compatibility.

| Activation Method (P5003) | Description |
|---|---|
| Tare Operation | The [TARE] activates the setpoint. It waits for a no-motion condition, then tares scale to net zero. The appropriate setpoint is then activated. |
| Remote Key 1 | (START key) |
| 355 only | The [START] key activates the setpoint. The remote key function (assigned at P800) is over-ridden. A setpoint and P5003 must be enabled for the start key to operate. |
| Remote Key 2 | (STOP key) |
| 355 only | The [STOP] key activates the setpoint. The remote key function (assigned at P801) is over-ridden. A setpoint and P5002 must be enabled for the start key to operate. |
| Auto-Start | Automatically activates the setpoint after motion ceases. |

## 5.13.2 Pre-Acts

Pre-Acts are control actions prior to reaching a desired target value. Necessary to prevent over-filling due to product flow rate, relay and valve response time and product suspension, Pre-Acts compensate for other system variables affect how much more product reaches the weighing device after the indicator has deactivated a setpoint.

### Pre-act 1

Used in dual-speed applications, pre-act 1 specifies when the Model 350/355 should switch from fast-fill to slow-fill, allowing the system to perform the bulk of a filling operation as quickly as possible before switching to a more manageable dribble mode for final cutoff. When using a single-speed device, set pre-act 1 to 0.

### Pre-act 2

Specifies the weight where the final cutoff should occur, enabling the Model 350/355 to compensate for a dispensing control's closure time and account for free-fall material. Free-fall is the amount of product that has passed the point of the dispensing control yet not yet reached the weighing device.

Pre-act values are entered in terms of the amount of product that would over-fill or how early to close the control device. For instance, after repeated tests, a system consistently over-fills by .5 lbs. This is the value that should be entered as the pre-act. The Model 350/355 would then deactivate the setpoint .5 lbs. less than the desired final target value.

| Parameter Setting | Actual Cutoff Value | Comments |
|---|---|---|
| Target = 400 lbs. | | Desired final weight. |
| Pre-Act 1 = 28 | 400 - 28 = 372 | Switch to slow feed at 372 lbs. |
| Pre-Act 2 = .5 | 400 - 0.5 = 399.5 | Final fill valve closes at 399.5 lbs. |

## 5.13.3 Learn Feature

The Model 350/355 can learn optimal pre-act values. When enabled, the learn feature will automatically adjust the final cutoff value based on an analysis of the five previous fills, helping achieve a final target by compensating for product viscosity, changes in plant air pressures, sticky valves, etc. For each cycle, the prior five final weights are analyzed and a new pre-act value is calculated.

## 5.13.4 Pause Feature

The Model 350/355 can pause setpoint operations. This is useful to provide a pause for mid-cycle operator breaks, mechanical adjustments, etc.

| Pause Setting | Action | Result |
|---|---|---|
| Disabled | | Pause feature disabled. |
| Keypad | Model 350/355 Key Press | Current cycle paused - all setpoints deactivated. |
| Remote Key | Remote Key Contact Closure | Current cycle paused - all setpoints deactivated. |
| Both | Model 350/355 Key Press or Remote Key Contact Closure | Current cycle paused - all setpoints deactivated. |

### Pause Setpoints on the Model 350

When invoked, Pause deactivates all setpoints. The display will show *Tare= ~ Abort*. Pressing [TARE] will abort the current cycle; any other keypress will resume the cycle. The Pause feature has four settings

### Pause Setpoints on the Model 355

When invoked, Pause deactivates all setpoints. Pressing the [TARE] key will pause the setpoints. The display will show *Abort ?Pause ~ Stop = Abort*. Pressing the [STOP] key again will abort the setpoints. Pressing the [START] key will resume all setpoints. In the independent setpoint mode, the setpoints will remain deactive until the [START] key is pressed.

## 5.14 Percentage Checkweigh

This feature is commonly used in checkweigh applications and must be enabled before attempting to use.

After a target weight is entered, upper and lower tolerances are entered as a percentage of the target. Over and under tolerance values are automatically calculated according to the percentages entered. The desired target may be based on gross weight, net weight or quantity (if counting is enabled).

| Setpoint Selection | Function | Description |
|---|---|---|
| P5100.1 | ChecP | Check-weigh by percentage |
| P5101.-- | Targ1 | Absolute target value |
| P5102.-- | PctLo | Low acceptance percentage |
| P5103.-- | PctHi | High acceptance percentage |
| P5104.0 | Based | Select from Net, Gross or Quantity |

### 5.14.1 Enter a Target Value

**Model 350**

1. Press [SELECT] until *tArG1* is displayed. If the target value shown is correct, press [TARE] to go to the PctLo value. To change the target value, go to step 2.
2. Press [PRINT] until the first digit of the new target is displayed. Press [UNITS] to accept the number displayed. Continue this step until the desired number is entered. Refer to the example below as a reference.

***Example: Target of 20***

2a. Press [PRINT] four times

- ❍ DISPLAY READS> 2

2b. Press [UNITS] to accept the 2 that is displayed

- ❍ DISPLAY READS> 2 .

2c. Press [PRINT] once

- ❍ DISPLAY READS> 20

2d. Press [TARE] to accept the target weight as 20

- ❍ DISPLAY READS> 20

3. Press [TARE] to accept the entered value. Once the tare key is pressed, *PctLo* will be displayed. This is where the low percentage will be entered. Enter target percentage value in the same manner as the target weight was entered above. If the displayed value is correct, press [TARE].
4. Next the *PctHi* value will be displayed. This is target percentage value for the high percentage. Enter this value in the same manner as the target weight was entered above. If the displayed value is correct press [SELECT]. The display will return to the weigh mode. Press [SELECT] to view the desired weigh mode parameter.

### Model 355

1. Press [SELECT] until *tArG1* is displayed.
2. Key in the target weight with the numeric keys and press [ENTER].
3. The *PctLo* value will be displayed. Key the in target percentage value with the numeric keys and press [ENTER].
4. The *PctHi* value will be displayed. Key the in target percentage value with the numeric keys and press [ENTER].
5. Press [SELECT] to select the desired weigh mode parameter.

## 5.14.2 Start Checkweighing

The checkweigh applications do not have a start function. Simply put the item to be weighed onto the scale platter. An annunciator will illuminate to indicate whether the item is within tolerance.

### Annunciators

Indication on the display showing the status of a relay. If the annunciator is illuminated, the corresponding setpoint is active

In order for the annunciators to activate, the displayed value must be at least five graduations above zero.

| Status | Annunciator Status | Annunciator Color (LED) |
|---|---|---|
| OVER | SP 1 Illuminated | Red |
| GOOD | SP 2 Illuminated | Green |
| UNDER | SP 3 Illuminated | Yellow |

# 5.15 Fill

The fill program is used for single-speed or dual-speed filling operations. The dual-speed fill operation allows for both a fast and a slow fill mode. During a fast-fill, setpoints 1 (SP1) and 2 (SP2) are activated. During a slow-fill or single-speed fill, only setpoint 1 (SP1) is activated. This feature must be enabled before attempting to use. Over filling can be prevented with the use of pre-act values (PA1 and PA2). Pre-act 1 (PA1) is used for switching the fast fill to a slow fill. Pre-act 2 (PA2) is used as a final cutoff value.

| Setpoint Selection | Function | Description |
|---|---|---|
| P5100.1 | Fill | Select Fill Setpoint Operation |
| P5101.-- | Targ1 | Final Fill Target Value |
| P5104.0 | Based | Select between Net or Quantity |
| P5105.-- | PA 1 | Pre-Act 1 Value (Fast-to-Slow Value; 0 for Single-Speed) |
| P5107.0 | Start 1 | Setpoint Activation Method |

| Setpoint Selection | Function | Description |
|---|---|---|
| P5109.-- | PA 2 | Pre-Act 2 Value (Final Cutoff) |
| P5110.1 | Learn 2 | Learn Feature for Pre-Act 2 |
| P5114.1 | PrAc 1 | Pre-Act 1 Available as Subset in Weigh Mode |
| P5115.1 | PrAc 2 | Pre-Act 2 Available as Subset in Weigh Mode |
| P5116.1 | Pause | Keypad Press invokes Pause |

## 5.15.1 Enter a Target Value

Pressing [TARE] or [ENTER] alone allows access to the subsets. PA1 and PA2 are the subsets for Targ 1.

### Model 350

1. Press [SELECT] until *tArG1* is displayed.
2. Press [PRINT] until the first digit of the new target is displayed. Press [UNITS] to accept the number displayed. Continue this step until the desired number is entered. Refer to the example below.

***Example: Target of 20***

2a. Press [PRINT] four times

- ❍ DISPLAY READS> 2

2b. Press [UNITS] to accept the 2 that is displayed

- ❍ DISPLAY READS> 2 .

2c. Press [PRINT] once

- ❍ DISPLAY READS> 20

2d. Press [TARE] to accept the target weight as 20

- ❍ DISPLAY READS> 20

3. Press [TARE]. Once the tare key is pressed, it is possible that PA1 will be displayed if the pre-act parameter is enabled.

3a. If a value is desired, enter it in the same manner as the target weight was entered above. When the displayed value is correct, press [TARE].

3b. If no value is to be entered or PA1 is not displayed, press [TARE] to go to the next screen.

4. If PA2 is displayed, enter the value in the same manner as the target weight was entered above and press [TARE] to accept or press [TARE] to return to the weigh mode. Press [SELECT] to view the desired weigh mode parameter.

### Model 355

1. Press [SELECT] until *tArG1* is displayed.
2. Key in the desired target value with the numeric keys and press [ENTER].

3. The PA1 value will be displayed. Key the in value with the numeric keys and press [ENTER].
4. The PA2 value will be displayed. Key the in value with the numeric keys and press [ENTER].
5. Press [SELECT] to select the desired weigh mode parameter.

## 5.15.2 Start Fill

### Activation Method

The fill begins with the selected activation method. The method is determined by the parameters in the setup mode.

The deactivation of the setpoints is automatic. The desired target may be based on net or quantity (if counting is enabled).

***Activation types***

- Tare key - Press the [TARE] key to start the process. A tare weight will be set and the weight will switch to net zero.
- Remote key - Press the remote key switch.
- Auto-start - The process is automatically activated. It waits for a no-motion condition and then adds the target to the current displayed weight to achieve a relative cutoff value.

### Annunciators

Indication on the display showing the status of a relay. If the annunciator is illuminated, the corresponding setpoint is active

In order for the annunciators to activate, the displayed value must be at least five graduations above zero.

| Fill Status | Annunciator Status |
|---|---|
| Fast Fill | SP 1 & SP 2 Illuminated |
| Dribble Fill (or Single-Speed Fill) | SP 1 Illuminated |
| Fill Done or Pause | SP 1 & SP 2 Off |

### Fill Example

With a system set up to fill 55-gallon drums with motor oil, the following settings might be used to achieve an accurate final fill weight of 400 lbs.:

| Parameter Setting | Actual Cutoff Value | Comments |
|---|---|---|
| Targ 1 = 400 | | Desired final weight. |
| Pre-act 1 = 28 | 400 - 28 = 372.0 | Switch to dribble feed at 372. |
| Pre-act 2 = .5 | 400 - 0.5 = 399.5 | Final fill valve closes at 399.5. |

## 5.16 Batch

The standard batch program is used for batching up to three separate items. Ingredients 1 through 3 use setpoints and pre-acts 1 through 3 respectively. Ingredients are batched one at a time. Free falling product can be accounted for with the use of pre-act values (PA1 - PA3). This feature must be enabled before attempting to use.

| Setpoint Selection | Function | Description |
|---|---|---|
| P5100.3 | Batch | 2 or 3 ingredient batching. |
| P5101.-- | Targ1 | Ingredient 1 target value. |
| P5104.0 | Based | Select from net or count (quantity). |
| P5105.-- | PA 1 | Pre-act 1 value (final cutoff for ingredient 1). |
| P5106.1 | Learn 1 | Learn feature for pre-act 1 enabled. |
| P5107.0 | Start 1 | Setpoint 1 activation method. |
| P5108.-- | Targ 2 | Ingredient 2 target value. |
| P5109.-- | PA 2 | Pre-act 2 value (final cutoff for ingredient 2). |
| P5110.1 | Learn 2 | Learn feature for pre-act 2 enabled. |
| P5111.0 | Start 2 | Setpoint 2 activation method. |
| P5116.1 | Pause | Keypad press invokes pause mode. |
| P5117.-- | Targ 3 | Ingredient 3 target value. |
| P5118.-- | PrAc 3 | Pre-act 3 value (final cutoff for ingredient 3). |
| P5119.1 | Learn 3 | Learn feature for pre-act 3 enabled. |
| P5120.0 | Start 3 | Setpoint 3 activation method. |

### 5.16.1 Enter a Target

Pressing [TARE] or [ENTER] alone allows access to the subsets. PA 1 and PA 2 are the subsets for Targ 1.

#### Model 350

1. Press [SELECT] until *tArG1* is displayed.
2. Press [PRINT] until the first digit of the new target is displayed. Press [UNITS] to accept the number displayed. Continue this step until the desired number is entered.

***Example: Target of 20***

2a. Press [PRINT] four times

- ❍ DISPLAY READS> 2

2b. Press [UNITS] to accept the 2 that is displayed

- ❍ DISPLAY READS> 2 .

2c. Press [PRINT] once

- ❍ DISPLAY READS> 20

2d. Press [TARE] to accept the target weight as 20

- DISPLAY READS> 20

3. Press [TARE]. Once the tare key is pressed, it is possible that PA1 will be displayed if the pre-act parameter is enabled.

3a. If a value is desired, enter it in the same manner as the target weight was entered above. When the displayed value is correct, press [TARE].

3b. If no value is to be entered or PA1 is not displayed, press [TARE] to go to the next screen.

4. Repeat steps 2 and 3 until all targets and pre-acts are entered. Press [TARE] to return to the weigh mode.

### Model 355

1. Press [SELECT] until *tArG1* is displayed.
2. Key in the desired target value with the numeric keys and press [ENTER].
3. The PA1 value will be displayed. Key the in value with the numeric keys and press [ENTER].
4. Repeat steps 2 and 3 for tArG2, PA2, tArG3 and PA3.
5. Press [SELECT] to select the desired weigh mode parameter.

## 5.16.2 Start Batch

### Activation Method

The batch begins with the selected activation method. The method is determined by the parameters in the setup mode. The deactivation of the setpoints is automatic. The desired target may be based on net or quantity (if counting is enabled).

### Activation types

- Tare key - Press the [TARE] key to start the process. A tare weight will be set and the weight will switch to net zero.
- Remote key - Press the remote key switch.
- Auto-start - The process is automatically activated. It waits for a no-motion condition and then adds the target to the current displayed weight to achieve a relative cutoff value.

### Annunciators

Indication on the display showing the status of a relay. If the annunciator is illuminated, the corresponding setpoint is active.

In order for the annunciators to activate, the displayed value must be at least five graduations above zero.

| Batch Status | Annunciator Status | Setpoint Status (Requires Setpoint Option Board) |
|---|---|---|
| Fill 1 | SP 1 Illuminated | Relay 1 Contacts Closed, Relay 2 and 3 Contacts Open |
| Fill 2 | SP 2 Illuminated | Relay 2 Contacts Closed, Relay 1 and3 Contacts Open |
| Fill 3 | SP 3 Illuminated | Relay 3 Contacts Closed, Relay 1 and 2 Contacts Open |

### *Batch Example*

With a system set up a system to make a 50,000 lb batch with water (30,000 lbs.), corn syrup (15,000 lbs.) and caramel color (5,000 lbs.), ingredient 1 should start with [TARE] and subsequent ingredients should auto-start.

| Parameter Setting | Actual Cutoff Value | Comments |
|---|---|---|
| Target 1 = 30,000 | | Desired water weight. |
| Pre-Act 1 = 100 | 30,000 - 100 = 29,900 | Water valve closes at 29,900 lbs. Free-fall will bring weight to 30,000. |
| Start 1 = Tare | | Start water with [TARE]. |
| Target 2 = 15,000 | | Desired corn syrup weight. |
| Pre-Act 2 = 236 | 15,000 - 236 = 14,764 | Corn syrup valve closes at 14,764 lbs. Free-fall will bring weight to 15,000. |
| Start 2 = Auto | Calculated cutoff value for corn syrup is added to current displayed weight | Start corn syrup when water is done and motion has stopped. |
| Target 3 = 5,000 | | Desired caramel coloring weight. |
| Pre-Act 3 = 142 | 5,000 - 142 = 4,858 | Carmel coloring valve closes at 4,858. Free-fall will bring weight to 5,000. |
| Start 3 = Auto | Calculated cutoff value for caramel coloring is added to current displayed weight | Start caramel coloring when corn syrup is done and motion has ceased. |

## 5.17 Discharge

The discharge program is designed for single-speed or dual-speed dispensing of product from a larger weigh vessel. Discharge is a loss-in-weight application similar in operation to the fill program. When a discharge is initiated, the scale automatically tares and comes to a net zero weight. The appropriate setpoints are activated and material is discharged until the decreasing net weight reaches the desired target value. Free falling product can be accounted for with the use of pre-act values (PA1 - PA3). This feature must be enabled before attempting to use.

| Setpoint Selection | Function | Description |
|---|---|---|
| P5100.1 | Discharge | Select discharge setpoint operation. |
| P5101.-- | Targ1 | Final dispensed target value. |
| P5104.0 | Based | Select between net or count (quantity) |
| P5105.-- | PA 1 | Pre-act 1 value (fast-to-slow value; 0 for single-speed). |
| P5107.0 | Start 1 | Setpoint activation method. |
| P5109.-- | PA 2 | Pre-act 2 value (final cutoff). |
| P5110.1 | Learn 2 | Learn feature for pre-act 2. |
| P5114.1 | PrAc 1 | Pre-act 1 available as subset in Weigh Mode. |
| P5115.1 | PrAc 2 | Pre-act 2 available as subset in Weigh Mode. |
| P5116.1 | Pause | Keypress invokes pause. |

### 5.17.1 Enter a Target

**Model 350**

1. Press [SELECT] until *tArG1* is displayed.
2. Press [PRINT] until the first digit of the new target is displayed. Press [UNITS] to accept the number displayed. Continue this step until the desired number is entered.

***Example: Target of 20***

2a. Press [PRINT] four times

- ❍ DISPLAY READS> 2

2b. Press [TARE] to accept the 2 that is displayed

- ❍ DISPLAY READS> 2 .

2c. Press [PRINT] once

- ❍ DISPLAY READS> 20

2d. Press [TARE] to accept the target weight as 20

- ❍ DISPLAY READS> 20

3. Press [TARE]. Once the tare key is pressed, it is possible that PA1 will be displayed if the pre-act parameter is enabled.

3a. If a value is desired, enter it in the same manner as the target weight was entered above. When the displayed value is correct, press [TARE].

3b. If no value is to be entered or PA1 is not displayed, press [TARE] to go to the next screen.

4. Repeat steps 2 and 3 until all targets and pre-acts are entered.

5. Press [TARE] to return to the weigh mode.

**Model 355**

1. Press [SELECT] until *tArG1* is displayed.

2. Key in the desired target value with the numeric keys and press [ENTER].

3. The PA1 value will be displayed. Key the in value with the numeric keys and press [ENTER].

4. Repeat steps 2 and 3 until all targets and pre-acts are entered.

5. Press [SELECT] to select the desired weigh mode parameter.

## 5.17.2 Pre-acts

Pre-act 1 is used for dual-speed dispensing. Pre-act 1 specifies when the system should switch from fast-discharge to slow-discharge. When using a single-speed device, pre-act 1 should be set to 0 from the Setup Mode. Pre-act 2 specifies the point where the final cutoff should occur, regardless of a single-speed or dual-speed operation.

## 5.17.3 Start Discharge

### Activation Method

The dispensing activation is limited to [TARE] or a remote key input. The deactivation of the setpoints is automatic. The desired target may be based on net or quantity (if counting is enabled).

The discharge begins with the selected activation method. The method is determined by the parameters in the setup mode.

The deactivation of the setpoints is automatic. The desired target may be based on net or quantity (if counting is enabled).

### Activation types

- Tare key - Press the [TARE] key to start the process. A tare weight will be set and the weight will switch to net zero.
- Remote key - Press the remote key switch

.

| Discharge Status | Annunciator Status | Setpoint Status (Requires Setpoint Option Board) |
|---|---|---|
| Fast Discharge | SP 1 & SP 2 Illuminated | Relay 1 and 2 Contacts Closed |
| Slow (or Single-Speed) Discharge | SP 1 Illuminated | Relay 1 Contacts Closed |
| Fill Done or Pause | SP 1 & 2 Off | Relay 1 and 2 Contacts Open |

### 5.17.4 Discharge Example

With a system set up to dispense ball bearings from a 50,000 lb weigh-bin and the fast-feed requiring an early cutoff to slow-feed, the following settings might be used to achieve accurate dispensing of 1000 bearings:

| Parameter Setting | Actual Cutoff Value | Comments |
|---|---|---|
| Targ 1 = 1000 | 0 - 1000 = (-1000) | Desired quantity (decreasing value from a net zero: enter as a positive value). |
| Based = Qty | | Targets are compared to quantity (P170 Enabled). |
| PA 1 = 200 | 1000 - 200 = 800<br>0 - 800 = (-800) | Switch to slow feed at -800 bearings (decreasing value from a net zero: enter as a positive value). |
| Start = [TARE] | | Start discharge with [TARE]. |
| PA 2 = 15 | 1000 - 15 = 985<br>0 - 985 = (-985) | Final gate begins closing at 985 bearings. Delayed closure brings final quantity to 1000 (decreasing value from a net zero: enter as a positive value). |

## 5.18 Fill and Discharge (Both)

The 'Fill and Discharge' program combines a fill operation with a discharge operation. This automates a single-speed vessel filling operation with a single-speed multiple dispensing function. Setpoint 1 is used for filling the vessel and Setpoint 2 is used for product discharge. Free falling product can be accounted for with the use of pre-act values (PA1 and PA2). This feature must be enabled before attempting to use.

| Setpoint Selection | Function | Description |
|---|---|---|
| P5100.5 | Both | Select both setpoint operation |
| P5101.-- | Targ1 | Vessel fill target value |
| P5104.0 | Based | Select from Net or Count (Quantity) |
| P5105.-- | PA 1 | Pre-act 1 value for vessel fill |
| P5106.1 | Learn 1 | Learn feature for pre-act 1 |
| P5107.0 | Start 1 | Setpoint 1 activation method |
| P5108.-- | Targ 2 | Vessel discharge target value |
| P5109.-- | PA 2 | Pre-act 2 value for vessel discharge |

| Setpoint Selection | Function | Description |
|---|---|---|
| P5110.1 | Learn 2 | Learn feature for pre-act 2 |
| P5111.0 | Start 2 | Setpoint 2 activation method |
| P5116.1 | Pause | Keypad press invokes pause |

## 5.18.1 Enter a Target

### Model 350

1. Press [SELECT] until *tArG1* is displayed.
2. Press [PRINT] until the first digit of the new target is displayed. Press [UNITS] to accept the number displayed. Continue this step until the desired number is entered.

***Example: Target of 20***

2a. Press [PRINT] four times

- DISPLAY READS> 2

2b. Press [UNITS] to accept the 2 that is displayed

- DISPLAY READS> 2 .

2c. Press [PRINT] once

- DISPLAY READS> 20

2d. Press [TARE] to accept the target weight as 20

- DISPLAY READS> 20

3. Press [TARE]. Once the tare key is pressed, it is possible that PA1 will be displayed if the pre-act parameter is enabled.

3a. If a value is desired, enter it in the same manner as the target weight was entered above. When the displayed value is correct, press [TARE].

3b. If no value is to be entered or PA1 is not displayed, press [TARE] to go to the next screen.

4. Repeat steps 2 and 3 until all targets and pre-acts are entered. Press [TARE] to return to the weigh mode.

### Model 355

1. Press [SELECT] until *tArG1* is displayed.
2. Key in the desired target value with the numeric keys and press [ENTER].
3. The PA1 value will be displayed. Key the in value with the numeric keys and press [ENTER].
4. Repeat steps 2 and 3 until all targets and pre-acts are entered.
5. Press [SELECT] to select the desired weigh mode parameter.

## 5.18.2 Pre-acts

Pre-act 1 is used for vessel filling. Pre-act 1 specifies the point where the final cutoff for the fill should occur. Pre-act 2 specifies the point where the final cutoff for the material discharge should occur.

*Pre-act 1 controls setpoint 1. Pre-act 2 controls setpoint 2.*

## 5.18.3 Activation Method

The fill and discharge functions begin with their selected activation methods. The deactivation of the setpoints is automatic. The desired target may be based on net or quantity (if counting is enabled).

### Activation types

- Tare key - Press the [TARE] key to start the process. A tare weight will be set and the weight will switch to net zero.
- Remote key - Press the remote key switch.
- Auto-start - The process is automatically activated. It waits for a no-motion condition and then adds the target to the current displayed weight to achieve a relative cutoff value.

### Annunciators

Indication on the display showing the status of a relay. If the annunciator is illuminated, the corresponding setpoint is active.

In order for the annunciators to activate, the displayed value must be at least five graduations above zero.

| Status | Annunciator Status | Setpoint Status (Requires Setpoint Option Board) |
|---|---|---|
| Vessel Fill | SP 1 Illuminated | Relay 1 Contacts Closed |
| Vessel Discharge | SP 2 Illuminated | Relay 2 Contacts Closed |
| Fill Done or Pause | SP 1 & SP 2 Off | Relay 1 and Relay 2 Contacts Open |

## 5.18.4 Pause

The 350/355 can pause setpoint operations. This is useful as a safety device, for mid-cycle operator breaks, mechanical adjustments, etc. This feature must be enabled before attempting to use.

When invoked, Pause deactivates all setpoints. The display will show *Tare= ~ Abort*. Pressing [TARE] will abort the current cycle; any other keypress will resume the cycle. The Pause feature has four settings:

| Pause Setting | Action | Result |
|---|---|---|
| Keypad | 350/355 Key Press | Current cycle paused - all setpoints deactivated. |
| Remote Key | Remote Key Contact Closure | Current cycle paused - all setpoints deactivated. |
| Both | 350/355 Key Press OR Remote Key Contact Closure | Current cycle paused - all setpoints deactivated. |

### 5.18.5 Fill and Discharge Example

| Parameter Setting | Actual Cutoff Value | Comments |
|---|---|---|
| Targ 1 = 2000 | | Desired vessel fill target. |
| Based = Net | | Targets are compared to net weight. |
| PA 1 = 5 | 2000 - 5 = 1995 | Fill valve closes at 1995 lbs. |
| Start 1 = R-but | | Start fill with remote key closure. |
| Targ 2 = 45 | 0 - 45 = (-45) | Desired discharge target (decreasing weight from a net zero: enter as a positive value). |
| PA 2 = 5 | 45 - 5 = 40<br>0 - 40 = (-40) | Discharge valve closes at (-40) lbs. (decreasing weight from a net zero: enter as a positive value). |

## 5.19 Absolute Checkweigh

This program is commonly used for check-weigh applications where the accepted tolerance will be an absolute value between and upper and lower limit.

| Setpoint Selection | Function | Description |
|---|---|---|
| P5100.6 | ChecA | Check-weigh by absolute value |
| P5101.-- | Targ1 | Absolute target value |
| P5102.-- | Lo | Low acceptance value |
| P5103.-- | Hi | High acceptance value |
| P5104.0 | Based | Select from Net, Gross or Count (Quantity) |

After a target weight is entered, upper and lower tolerances are entered as absolute values. The desired target may be based on gross weight, net weight, or quantity (if counting is enabled). Only the annunciators will light to indicator the setpoint status. Be sure to enter both the upper and limits. Failure to enter one of these values will cause a setpoint error. This feature must be enabled before attempting to use.

## 5.19.1 Enter a Target Value

### Model 350

1. Press [SELECT] until *tArGL* is displayed. The low target value will need to be entered. Go to step 2.
2. Press [PRINT] until the first digit of the new target is displayed. Press [UNITS] to accept the number displayed. Continue this step until the desired number is entered.

***Example: Target of 20***

2a. Press [PRINT] four times

- DISPLAY READS> 2

2b. Press [UNITS] to accept the 2 that is displayed

- DISPLAY READS> 2 .

2c. Press [PRINT] once

- DISPLAY READS> 20

2d. Press [TARE] to accept the target weight as 20

- DISPLAY READS> 20

3. Press [TARE]. Once the tare key is pressed, tArGH will be displayed. This is where the high target value will be entered. Enter this value in the same manner as the target weight was entered above. If the displayed value is correct, press [TARE]. The display will return to the gross mode.

***Model 355***

1. Press [SELECT] until *tArGL* is displayed.
2. Key in the low target weight with the numeric keys and press [ENTER].
3. The tArGH value will be displayed. Key the in value with the numeric keys and press [ENTER].
4. Press [SELECT] to select the desired weigh mode parameter.

## 5.19.2 Start Checkweighing

The checkweigh applications do not have a start function. Simply put the item to be weighed onto the scale platter. An annunciator will illuminate to indicate whether the item is within tolerance.

### Annunciators

Indication on the display showing the status of a relay. If the annunciator is illuminated, the corresponding setpoint is active.

In order for the annunciators to activate, the displayed value must be at least five graduations above zero.

| Status | Annunciator Status | Annunciator Color (LED) |
|---|---|---|
| OVER | SP 1 Illuminated | Red |
| GOOD | SP 2 Illuminated | Green |
| UNDER | SP 3 Illuminated | Yellow |

### 5.19.3 Absolute Checkweighing Example

With a system set up to check-weigh 50 lb. cement bags, the following settings might be used check-weigh bag from 49.5 to 51.5 lbs.:

| Parameter Setting | Acceptable Values | Comments |
|---|---|---|
| Target = 50.00 | | Desired bag weight. |
| Low Value = 49.50 | 0 - 49.50 lbs. | Low acceptable range = 0 to 49.50 lbs. |
| Target Window | 49.50 - 51.50 lbs | Good light within this range |
| High Value = 51.50 | 51.50 lbs. and above | High acceptable range = 51.50 lbs. and above |

## 5.20 Target Deviation Checkweigh

The target deviation method uses a target value in which the upper and lower tolerances are deviated from the target. The upper and lower tolerances are fixed values. The accept window is varied by adding the high tolerance to the target and subtracting the low tolerance from the target. This feature is commonly used in check-weigh applications. The desired target may be based on gross weight, net weight or quantity (if counting is enabled). The annunciators will light on the indicator display or physical setpoints can be added. This feature must be enabled before attempting to use.

| Setpoint Selection | Function | Description |
|---|---|---|
| P5100.8 | Checb | Target Deviation Mode |
| P5101.-- | Targ1 | Target value |
| P5102.-- | Lo | Low acceptance deviation |
| P5103.-- | Hi | High acceptance deviation |
| P5104.0 | Based | Select from Net, Gross or Quantity |

### 5.20.1 Enter a Target Value

**Model 350**

1. Press [SELECT] until *tArG1* is displayed. The target value will need to be entered. Go to step 2.

2. Press [PRINT] until the first digit of the new target is displayed. Press [UNITS] to accept the number displayed. Continue this step until the desired number is entered.

***Example: Target of 20***

2a. Press [PRINT] four times

- DISPLAY READS> 2

2b. Press [UNITS] to accept the 2 that is displayed

- DISPLAY READS> 2 .

2c. Press [PRINT] once

- DISPLAY READS> 20

2d. Press [ENTER] to accept the target weight as 20

3. Press [TARE]. Once the tare key is pressed, *Lo* will be displayed. This is where the lower tolerance value will be entered. Enter this value in the same manner as the target weight was entered above. If the displayed value is correct, press [TARE].

4. Press [TARE]. Once the tare key is pressed, *Hi* will be displayed. This is where the upper tolerance value will be entered. Enter this value in the same manner as the target weight was entered above. If the displayed value is correct, press [TARE]. The display will return to the gross mode.

### Model 355

1. Press [SELECT] until *tArG1* is displayed.

2. Key in the target weight with the numeric keys and press [ENTER].

3. The Lo value will be displayed. Key the in value with the numeric keys and press [ENTER].

4. The Hi value will be displayed. Key the in value with the numeric keys and press [ENTER].

5. Press [SELECT] to select the desired weigh mode parameter.

## 5.20.2 Start Checkweighing

The checkweigh applications do not have a start function. Simply put the item to be weighed onto the scale platter. An annunciator will illuminate to indicate whether the item is within tolerance.

### Annunciators

Indication on the display showing the status of a relay. If the annunciator is illuminated, the corresponding setpoint is active.

In order for the annunciators to activate, the displayed value must be at least five graduations above zero.

| Status | Annunciator Status | Annunciator Color (LED) |
|---|---|---|
| OVER | SP 1 Illuminated | Red |
| GOOD | SP 2 Illuminated | Green |
| UNDER | SP 3 Illuminated | Yellow |

### 5.20.3 Target Deviation Checkweighing Example

With a system set up to check-weigh ice cream containers, the following settings might be used to guarantee container weights from 1.98 to 2.04 lbs.:

| Parameter Setting | Acceptable Values | Comments |
|---|---|---|
| Target = 10.00 | | Desired container weight. |
| Lo Value = 0.5 | 10.00 - 0.5 = 9.50 | Low acceptable range = 9.50 to 10.00 |
| Hi Value = 0.25 | 10.00 + 0.25 = 10.25 | High acceptable range = 10.00 to 10.25 |

## 5.21 Batch 2

The batch 2 program is used for batching up to three separate items without using pre-act values. Ingredients 1 through 3 use setpoints 1 through 3 respectively. Ingredients are batched one at a time. The target values can only be set from the weigh mode by pressing the [SELECT] key.

After a batch is run all target values will be set back to 0. The target values will be set to 0 after accessing the setup mode or if power is cycled. If a new batch is started when all target values are set to 0 an error message *No Targ* will be displayed. This feature must be enabled before attempting to use.

### 5.21.1 Enter a Target

**Model 350**

1. Press [SELECT] until *tArG1* is displayed.
2. Press [PRINT] until the first digit of the new target is displayed. Press [UNITS] to accept the number displayed. Continue this step until the desired number is entered.

***Example: Target of 20***

2a. Press [PRINT] four times

- ❍ DISPLAY READS> 2

2b. Press [UNITS] to accept the 2 that is displayed

- ❍ DISPLAY READS> 2 .

2c. Press [PRINT] once

- DISPLAY READS> 20

2d. Press [TARE] to accept the target weight as 20

- DISPLAY READS> 20

3. If more than one target is enabled, press [SELECT] to advance to the next target (e.g. tArG2). Repeat steps 2 and 3 until all values are entered.

### Model 355

1. Press [SELECT] until *tArG1* is displayed.
2. Key in the target weight with the numeric keys and press [ENTER].
3. If more than one target is enabled, press [SELECT] to advance to the next target (e.g. tArG2). Repeat steps 2 and 3 until all values are entered.

## 5.21.2 Activation Method

The filling of each ingredient begins when one of three selectable start functions occur. Each ingredient may have its own start function. The deactivation of the setpoint is automatic. The desired targets may be based on net weight or quantity (if counting is enabled).

### Annunciators

Indication on the display showing the status of a relay. If the annunciator is illuminated, the corresponding setpoint is active.

In order for the annunciators to activate, the displayed value must be at least five graduations above zero.

| Status | Annunciator Status | Annunciator Color (LED) |
|---|---|---|
| Fill 1 | SP 1 Illuminated | Relay 1 Contacts Closed, Relay 2 and 3 Contacts Open |
| Fill 2 | SP 2 Illuminated | Relay 2 Contacts Closed, Relay 1 and 3 Contacts Open |
| Fill 3 | SP 3 Illuminated | Relay 3 Contacts Closed, Relay 1 and 2 Contacts Open |

## 5.21.3 Batch2 Example

With a system set up a system to make a 50,000 lb batch with water (30,000 lbs.), corn syrup (15,000 lbs.) and caramel color (5,000 lbs.), ingredient 1 should start with [TARE] and subsequent ingredients should auto-start.

| Parameter Setting | Actual Cutoff Value | Comments |
|---|---|---|
| Target 1 = 30,000 | Desired water weight. | Target 1 = 30,000 |
| Based = Net | Targets are compared to net weight. | Based = Net |
| Start 1 = Tare | Start water with [TARE] | Start 1 = Tare |

| Parameter Setting | Actual Cutoff Value | Comments |
|---|---|---|
| Target 2 = 15,000 | Desired corn syrup weight. | Target 2 = 15,000 |
| Start 2 = Auto | Start corn syrup when water is done and motion has stopped. | Start 2 = Auto |
| Target 3 = 5,000 | Desired caramel coloring weight. | Target 3 = 5,000 |
| Start 3 = Auto | Start caramel coloring when corn syrup is done and motion has ceased. | Start 3 = Auto |

## 5.22 Independent Setpoint Operation

Independent Setpoints allow controlling setpoints when the gross, net or quantity (if counting is enabled) is above or below a target value. The reset (deactivation) choice of each setpoint is selectable from Tare, Remote Key, Auto, Non-latching or Absolute...

| Setpoint Selection | Function | Description |
|---|---|---|
| P5100.7 | Indep | Independent Setpoints. |
| P5121.1 | Base 1 | Select from Net, Gross or Count (Quantity) for setpoint 1. |
| P5122.0 | Act 1 | Activate setpoint 1 when weight is above or below. |
| P5123.-- | Targ 1 | Setpoint 1 target for weight to either rise above or fall below. |
| P5124.0 | Stbl 1 | Setpoint 1 activation stability setting. |
| P5125.0 | Rset 1 | Reset selection for setpoint 1. |
| P5126.-- | Rtrg 1 | Value for reset. *Only available if "Value" is selected for Reset 1. |
| P5127.1 | Rstb 1 | Reset 1 stability setting. |
| P5131.1 | Base 2 | Select from Net, Gross or Count (Quantity) for Setpoint 2. |
| P5132.0 | Act 2 | Activate setpoint 2 when weight is above or below. |
| P5133.-- | Targ 2 | Setpoint 2 target for weight to either rise above or fall below. |
| P5134.0 | Stbl 2 | Setpoint 2 stability setting. |
| P5135.0 | Rset 2 | Reset selection for setpoint 2. |
| P5136.-- | Rtrg 2 | Value for reset. *Only available if "Value" is selected for Reset 2. |
| P5137.1 | Rstb 2 | Reset 2 stability setting. |
| P5141.1 | Base 3 | Select from Net, Gross or Count (Quantity) for Setpoint 3. |
| P5142.0 | Act 3 | Activate setpoint 3 when weight is above or below. |
| P5143.-- | Targ 3 | Setpoint 3 target for weight to either rise above or fall below. |
| P5144.0 | Stbl 3 | Setpoint 3 stability setting. |
| P5145.0 | Rset 3 | Reset selection for setpoint 3. |
| P5146.-- | Rtrg 3 | Value for reset. *Only available if "Value" is selected for Reset 3. |
| P5147.1 | Rstb 3 | Reset 3 stability setting. |

## 5.22.1 Setpoint Activation

Independent Setpoints can be activated when the gross weight, net weight or quantity (if counting is enabled) is above or below a target value. When an independent setpoint is set to Activate Above, the setpoint will activate when the selected mode (gross, net or quantity) is equal to or above the target. When set to Activate Below, the selected mode must actually be below the target.

*A setpoint option board may be installed to allow the Model 350/355 to directly control lights, buzzers, valves or relays. Also, the setpoints can be configured to ignore or heed the stability setting (P114).*

| Independent Status | Annunciator Status | Setpoint Status (Requires Setpoint Option Board) |
|---|---|---|
| Setpoint 1 Active | SP 1 Illuminated | Relay 1 Closed |
| Setpoint 2 Active | SP 2 Illuminated | Relay 2 Closed |
| Setpoint 3 Active | SP 3 Illuminated | Relay 3 Closed |

***Independent Setpoint Reset (deactivation) choices:***

| Parameter Setting | Reset Choice | Description |
|---|---|---|
| P51x5.0 | Tare | Setpoint deactivates with [TARE]. |
| P51x5.1 | Remote Key | Setpoint deactivates with Remote Key closure. |
| P51x5.2 | Auto | Setpoint deactivates when weight returns to +/- 5 graduations of zero and stabilizes. |
| P51x5.3 | Non-Latched | Setpoint deactivates when weight value is in a range opposite of the activation setting. |
| P51x5.4 | Reset Value | Setpoint deactivates when weigh reaches a second value and stabilizes. |

*The Pre-Acts, Learn Mode, and Pause Feature options are not applicable to Independent Setpoint operation.*

## 5.22.2 Changing Targets from the Weigh Mode

When Independent Setpoints are configured in the setpoint setup, Targ 1, 2 and 3 automatically become available modes for the [SELECT] key. An entry followed by [TARE] or [ENTER] changes the currently viewed target. If the reset for a setpoint is set to 'value', then pressing [TARE] or [ENTER] alone will allow access to the subset of the target. Rtrg 1, 2 and 3 are the respective subsets for Targ 1, 2 and 3.

### 5.22.3 Example

Setup a continuous-cycle static weighing system that fills a weigh hopper from a storage bin. The weigh hopper should stop the fill at a predetermined target, dump the product into a bag, and then restart the fill. A warning light should come on to give an operator advance notice to change the bag. The following setup might be used to achieve 1000 lb dumps:

| Parameter Setting | Description |
|---|---|
| P5121.1 ~ Base 1 ~ Net | Weigh hopper dump valve based on net weight. |
| P5122.0 ~ Act 1 ~ HI | Hopper dump valve opens when net weight rises above target 1. |
| P5123.-- ~ Targ 1 ~ 1000 | Target 1 value = 1000 kg. |
| P5124.1 ~ Stbl 1 ~ Inhib | Hopper dump valve delayed until scale is stable. |
| P5125.2 ~ Rset 1 ~ Auto | Dump valve auto-closes when net is within +/- 5 grads of zero and stable. |
| P5127.1 ~ Rstb1 ~ Inhib | Dump valve closure delayed until scale is stable. |
| P5131.1 ~ Base2 ~ Net | Weigh hopper fill valve based on net weight. |
| P5132.1 ~ Act 2 ~ Under | Fill valve opens when net weight falls below target 2. |
| P5133.-- ~ Targ 2 ~ =100 | Target 2 value = 100 kg. |
| P5134.1 ~ Stbl2 ~ =Inhib | Fill valve opening delayed until scale is stable. |
| P5135.4 ~ Rset 2 ~ =Targ | Fill valve closes when net weight reaches reset target 2. |
| P5136.-- ~ Rtrg2 ~ 1000 | Reset target 2 = 1000 kg. |
| P5137.0 ~ Rstb2 ~ Ignore | Fill valve closes regardless of stability. |
| P5141.1 ~ Base 3 ~ Net | Alarm light relay based on net weight. |
| P5142.0 ~ Act 3 ~ Above | Alarm relay activates when net weight rises above target 3. |
| P5143.-- ~ Targ 3 ~ =900 | Target 3 = 900 kg. |
| P5144.0 ~ Stbl3 ~ Ignore | Alarm relay activates regardless of scale stability. |
| P5145.3 ~ Rset 3 ~ Non-L | Alarm relay closes when net weight falls below target 3. |
| P5147.0 ~ Rset3 ~ Ignore | Alarm relay closes regardless of scale stability. |

## 5.23 Bargraph Setup (LCD)

A bargraph display is available for the ChecP, Fill, Batch, Dschg, Both and ChecA setpoint modes of operation. To enable the bargraph, refer to parameter P5011 (SPbar) in the Parameter Map section beginning on page 79. To weight each segment of the bargraph refer to parameter P5012 (bArPc) in the Parameter Map section beginning on page 79.

### 5.23.1 Scaling For "Bars" (Bargraph Arrows)

If the first bar turns off at the specified percentage (set at P5012) of the low limit, and the last bar turns off at the low limit, then the difference will be divided by 8 to determine the number of lbs per bar. At less than 5 grads, the entire graph is off.

**Example#1: "ChecP" (refer to Figure 5.2)**

- Lower Limit is set at 50lbs.
- P5012 is set for 80%

- Bar weight = 50 - 40 = 10
- 10/8 = 1.25 lbs

NOTE: Right-side bars will have the same scaling (lb per bar) as the left-side bars. They are represented as a mirror image of each other.

| Bars ON | Weight Range (Lower Tolerance Limit) |
|---|---|
| 9 | < 40 |
| 8 | 40.00 to 41.25 |
| 7 | 41.25 to 42.50 |
| 6 | 42.50 to 43.75 |
| 5 | 43.75 to 45.00 |
| 4 | 45.00 to 46.25 |
| 3 | 46.25 to 47.50 |
| 2 | 47.50 to 48.75 |
| 1 | 48.75 to 50.00 |

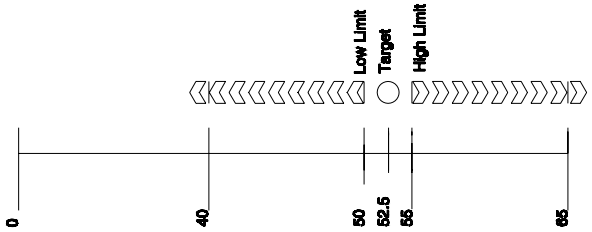



**Figure 5.2 Example #1 Bargraph Segments (Weight Value)**

### Example#2: "ChecP" (refer to Figure 5.3)

- Lower Limit is set at 50lbs.
- P5012 is set for 20%
- Bar weight = 50 - 10 = 40
- 40/8 = 5 lbs

NOTE: Right-side bars will have the same scaling (lb per bar) as the left-side bars. They are represented as a mirror image of each other.

| Bars ON | Weight Range (Lower Tolerance Limit) |
|---|---|
| 9 | < 10 |
| 8 | 10.00 to 15.00 |
| 7 | 15.00 to 20.00 |
| 6 | 20.00 to 25.00 |
| 5 | 5.00 to 30.00 |
| 4 | 30.00 to 35.00 |
| 3 | 35.00 to 40.00 |
| 2 | 40.00 to 45.00 |
| 1 | 45.00 to 50.00 |

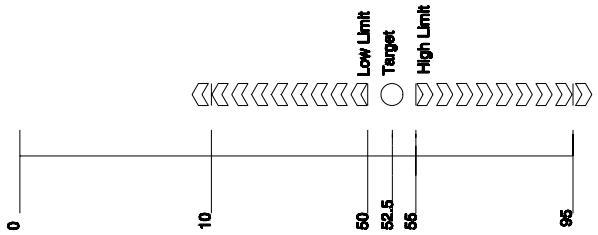



**Figure 5.3 Example #2 Bargraph Segments (Weight Value)**

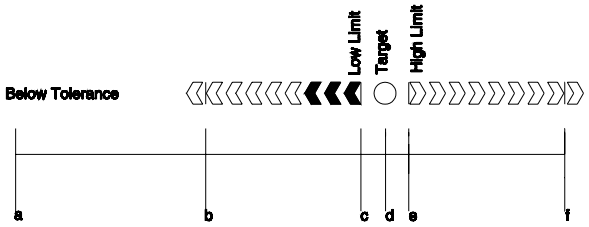



**Figure 5.4 Target Below Tolerance**

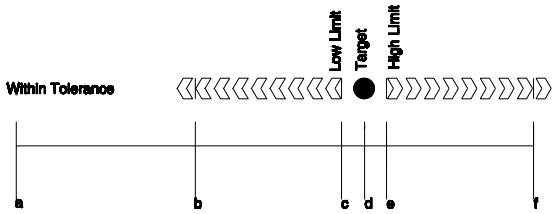



**Figure 5.5 Target Within Tolerance**

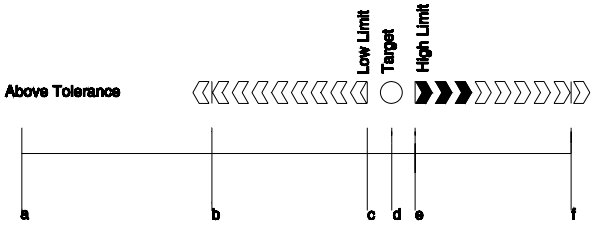



**Figure 5.6 Target Above Tolerance**

*NOTE: bargraph for filling and emptying modes*

*For modes other than check-weighing, the bars will be on only while the setpoints are on and during the "Done" at the end of a fill.*

*The bar weights will be calculated similar to the check-weigh modes of operation stated above for filling, batching, etc., except that the percentage will be based on the actual target, rather than the low-limit value (see the equation below). The operation for emptying (and the emptying portion of 'both') will be the same except that the weight will be going negative while the left side bars are turning off.*

*Although the setpoint annunciators are not motion-inhibited, the setpoint relay outputs will not activate until a no-motion condition exists.*

## 5.24 Analog Output Setup

Refer to the table below for parameter to setup the analog output.

| Parameter Setting | Displayed Name | Description | Type/choices (*=Default) |
|---|---|---|---|
| P171.00 | AnAlg | Enable analog option. | Disbl*, Enabl |
| P172.00 | AnPar | Parameter that analog signal corresponds to. Displayed corresponds to gross while viewing the gross weight and net otherwise. | Gross*, Net, Displayed |
| P173.-- | AnlFS | Full scale value at which P172 selection yields an output of 10 volts. If set to 0, uses P110 setting. | Numeric Entry:0* to ± 1,000,000 |
| P174.-- | AnOff | Offset value which yields a 0 volt output. | Numeric Entry:0* to ± 1,000,000 |
| P175.10 | AnRng | Range Value (1-10) which specifies the max value of analog output - entered in terms of voltage. NOTE: This does not change the analog span. A 0-10,000 lb. output set to 8 will stop increasing its analog signal at 8,000 lbs. | Numeric entry:0 to 10* |
| P176.01 | AnRst | Reset state - Specifies analog signal level when Model 350 and Model 355 enters Setup Mode. | 10 V (Max Output)<br>0 V (Min Output)<br>No Change* |
| P177.00 | AType | Specifies output type: voltage or current. | 0 -10 volts*,<br>0 -20mA,<br>4 -20mA |

The actual output signal is calculated as follows:

$$Vout = \left[ \frac{(P172: Parm\ Value) - (P174: Zero\ Offset)}{(P173: Full\ Scale\ Value) - (P174: Zero\ Offset)} \right] X\ 10$$

If the result is greater than the Max Range Value (P175), then the analog signal is limited to the Max Range Value.

### 5.24.1 Analog Output Calibration

| PARAMETER SETTING | DISPLAYED NAME | DESCRIPTION | TYPE/CHOICES (*=DEFAULT) |
|---|---|---|---|
| P61200 | 10oFF | Value required to precisely output 0V in 0 - 10V output mode (i.e. offset). | Numeric Entry: 0 to 15,000 (2,923*) |
| P61201 | 10Gn | Value required to precisely output 10V in 0 - 10V output mode (i.e. gain). | Numeric Entry: 50,000 to 65,535 (61,027*) |
| P61202 | 0oFF | Value required to precisely output 0 mA in 0 - 20 mA output mode (i.e. offset). | Not adjustable: (0*) |
| P61203 | 0Gn | Value required to precisely output 20 mA in 0 - 20mA output mode (i.e. gain). | Numeric Entry: 50,000 to 65,535 (54,555*) |
| P61204 | 4oFF | Value required to precisely output 0 mA in 4 - 20 mA output mode (i.e. offset). | Numeric Entry: 0 to 15,000 (10,910*) |
| P61205 | 4Gn | Value required to precisely output 20 mA in 4 - 20mA output mode (i.e. gain). | Numeric Entry: 50,000 to 65,535 (54,555*) |
| P61206 | Srln | Analog option board serial number. | Numeric Entry:(0*) - 4,294,967,295 |

An example of the printout included with each analog option kit follows below:

```
100%s23640%e        Access Setup Modes, Allowing Changes
60100%s%e           P60100.  c1998-GSE-
60101%s%e           P60101.  0Model 350  350p01009
60102%s%e           P60102.  06-30-2000
60200%s%e           P60200.  BrdSn573192
60201%s%e           P60201.  AuditTrail Euro  00001
60202%s%e           P60202.  InsSn329074
60203%s%e           P60203.  AuditTrail Cal.  00025
60204%s%e           P60204.  AuditTrail Setup 00050
61200%s2923%e       P61200.  10off   2923
61201%s61027%e      P61201.  10 Gn  61027
61202%s0%c          P61202.  0 off      0
61203%s54555%e      P61203.  0  Gn  54555
61204%s10910%e      P61204.  4 off  10910
61205%s54555%e      P61205.  4  Gn  54555
61206%s123456%e     P61206.  Srl n 123456
%z                  Exit Setup Mode
```

Analog calibration values can be entered into the Model 350 and Model 355 by keying in the data in the left-hand column, beginning at the line starting with "61200…", replacing the "%s" character pairs with the [SELECT] key and "%e" with the [TARE] (350) or [ENTER] (355) key. The line with the "%c" is not adjustable and cannot be entered.

You can adjust the included factory recommended offset and gain values to precisely configure the system being connected to these outputs. Once the initial factory values have been entered, pressing the [TARE] (350) or [ENTER] (355) key will cause the count value to increase one count, and pressing the [PRINT] + [UNITS] keys will decrement the count value by one count. All changes made are updated "live" to aid in calibrating a specific device to the analog option board output. Holding down the key(s) will repeat the increment/decrement action.

## 5.24.2 Analog Output Example

| Analog Parameter Setting | Parameter Description | Example Value | Comments |
|---|---|---|---|
| P172.01 | Net Weight | 3.00 lb | Current net weight. |
| P173.-- | Analog Full Scale | 20 | Net weight value that would give maximum analog output. |
| P174.-- | Zero Offset | -40 | Net weight value that would give minimum analog output. |
| P175.-- | Max Range Value | 8 | Maximum analog output allowed (entered in terms of voltage). |

$$Vout = \left[ \frac{3 - (-40)}{20 - (-40)} \right] X\ 10 = \left[ \frac{43}{60} \right] X\ 10 = 7.166$$

Since 7.166 v is less than 8 v (per P175), the output signal is not restricted and would be 7.166 v.

If a current output is selected, the output is a milli-amp current where 0 volts corresponds to either 0 mA or mA (as per P177) and 10 volts would translate to 20 mA. Values in between would be scaled proportionately:

$$Iout = \left[ \frac{(20mA - 4mA) \times 7.166}{10\ V} \right] + 4mA = \left[ \frac{16 \times 7.166}{10} \right] X\ 4 = 15.465mA$$

Analog signal resolution: the output is the result of a 16 bit conversion resulting in a resolution of 1 part in 65535 or 10 / 65535 = 0.00015 v.

# 6 Calibration

This chapter covers all methods of calibration.

## 6.1 Setup Mode Calibration

You can enter the Calibration Mode after accessing the Setup Mode to view and/or change parameter settings (see Setup Mode on page 61).

**To access the Calibration Mode when viewing any setup parameter:**

1. From the Setup Mode, press [ZERO].
2. Press [TARE] or [ENTER].

## 6.2 Fast Calibration

Fast Calibration allows calibration of the Model 350 / 355 scale system without accessing the Setup Mode.

**To access Fast Calibration from the Weigh Mode (350):**

1. From the Weigh Mode, press [ZERO] + [SELECT] simultaneously.
2. Press [ZERO] [PRINT] [UNITS] [TARE].

**To access Fast Calibration from the Weigh Mode (355):**

1. From the Weigh Mode key in [1] [0] [0] [SELECT].
2. Key in [5] [4] [3] [2] ]1] [ENTER]

Fast Calibration can also be accessed if the following data stream is received via the comm port:

100%s54321%e

## 6.3 Performing Calibration

Calibration always begins by establishing a zero (no-load) reference. A complete calibration also requires establishing a span (test load) reference. This section details various methods for obtaining zero and span references.

*Press [ZERO] or [CLR] during calibration to back up one step in the procedure.*

## 6.3.1 Establishing Zero

The Model 350/355 provides five methods for obtaining a zero (no load) calibration reference, First Zero, Last Zero, False Zero, Only Zero, and Cal Reset.

**To select a calibration method (350):**

1. Press [ZERO] + [SELECT] simultaneously to display the calibration prompt.
2. Press [ZERO] [PRINT] [UNITS] [TARE] to access the Calibration Mode.
3. Press [SELECT] to scroll through the five selections.
4. Press [TARE] to establish zero.

**To select a calibration method (355):**

1. Press [1] [0] [0] [SELECT] to display the calibration prompt.
2. Press [5] [4] [3] [2] ]1] [ENTER] to access the Calibration Mode.
3. Press [SELECT] to scroll through the five selections.
4. Press [ENTER] to establish zero.

## 6.3.2 First Zero

The most common zeroing procedure, First Zero is used to establish a new zero (no load) calibration reference before proceeding to span the Model 350/355. Use this method for first-time calibration and complete recalibration.

**First Zero Calibration Method (350):**

1. From the Weigh Mode, press [ZERO] + [SELECT] simultaneously
2. Press [ZERO] [PRINT] [UNITS] [TARE].
3. Remove any load on the scale.
4. Press [TARE] to establish zero.
5. Pause for motion delay.
6. Place a test weight on scale.
7. Enter the value of the test weight with the [PRINT] and [UNITS] keys.
8. Press [TARE] to establish span.
9. Pause for motion delay.
10. Press [TARE] to accept calibration.
11. Press [TARE] to save calibration.
12. Press [TARE] to exit calibration.
13. Remove calibration weight.

**First Zero Calibration Method (355):**

1. From the Weigh Mode key in [1] [0] [0] [SELECT].
2. Key in [5] [4] [3] [2] ]1] [ENTER].
3. Remove any load on the scale.
4. Press [ENTER] to establish zero.
5. Pause for motion delay.
6. Place a test weight on scale.
7. Enter the value of the test weight with the numeric keys.
8. Press [ENTER] to establish span.
9. Pause for motion delay.
10. Press [ENTER] to accept calibration.
11. Press [ENTER] to save calibration.
12. Press [ENTER] to exit calibration.
13. Remove the calibration weight.

### 6.3.3 Last Zero

The Last Zero procedure allows recalibration of the weighing device using an existing test load. This is especially beneficial when checking high capacity applications such as tank weighing to minimize the task of placing and removing test weights.

*Establish gross zero before entering setup or calibration!*

**Last Zero Calibration with Weight Already Applied (350):**

1. Remove any load on the scale.
2. Press [ZERO] to zero the scale.
3. Apply a test weight to verify calibration.
4. Press [ZERO] + [SELECT].
5. Press [ZERO]  [PRINT]  [UNITS]  [TARE].
6. Press [SELECT].
7. Press [TARE] to use last zero.
8. Enter the value of the test weight with the [PRINT] and [UNTIS] keys.
9. Press [TARE] to establish span.
10. Pause for motion delay.
11. Press [TARE] to accept calibration.

12. Press [TARE] to save calibration.
13. Press [TARE] to exit calibration.
14. Remove the calibration weight.

**Last Zero Calibration with Weight Already Applied (355):**

1. Remove any load on the scale.
2. Press [ZERO] to zero the scale.
3. Apply a test weight to verify calibration.
4. Press [1] [0] [0] [SELECT].
5. Press [5] [4] [3] [2] ]1] [ENTER].
6. Press [SELECT].
7. Press [ENTER] to use last zero.
8. Enter the value of the test weight with the numeric keys.
9. Press [ENTER] to establish span.
10. Pause for motion delay.
11. Press [ENTER] to accept calibration.
12. Press [ENTER] to save calibration.
13. Press [ENTER] to exit calibration.
14. Remove the calibration weight.

### 6.3.4 False Zero

False Zero calibrates the Model 350/355 without removing the current gross weight. This is particularly useful in tank weighing applications where it may be both time consuming and costly to completely empty the tank. This operation is achieved by establishing a false (temporary zero) zero reference. Test weights may then be added to verify calibration. The zero reference determined during the last calibration is not affected.

**False Zero Calibration Without Removing Existing Load (350):**

1. Press [ZERO] + [SELECT].
2. Press [ZERO]  [PRINT]  [UNITS]  [TARE].
3. Press [SELECT] [SELECT].
4. Press [TARE] to establish false (temporary) zero.
5. Pause to display calibration units.
6. Place a test weight on scale.
7. Enter the value of the test weight with the [PRINT] and [UNITS] keys.
8. Press [TARE] to establish span.

**Only Zero Calibration (355):**

1. From the Weigh Mode, press [1] [0] [0] [SELECT].
2. Press [5] [4] [3] [2] ]1] [ENTER].
3. Press [SELECT] [SELECT] [SELECT].
4. Remove any load on the scale.
5. Press [ENTER] to establish zero.
6. Pause for motion delay.
7. Press [ENTER] to accept calibration.
8. Press [ENTER] to save calibration.
9. Press [ENTER] to exit calibration.

## 6.3.5 Reset Calibration

Cal Reset may be necessary when an over-load or under-load condition exists, preventing the completion of the calibration process. Calibration Reset adjusts the zero and gain factors of the A/D amplifier to factory default values for maximum sensitivity.

After performing a calibration reset, a complete recalibration is required. The effects of a calibration reset do not take effect until the Model 350/355 is recalibrated and calibration information has been saved.

*If Code 02 (under-load) or Code 03 (over-load) is displayed during calibration, press [ZERO] or [CLR] to perform a calibration reset.*

**Reset Calibration Gain Factors (350):**

1. Press [ZERO] + [SELECT].
2. Press [ZERO]  [PRINT]  [UNITS]  [TARE].
3. Remove any load on the scale.
4. Press [TARE] to establish zero.
5. Place a test weight on scale.
6. Press [ZERO].
7. Remove any load on the scale.
8. Press [TARE] to establish zero.
9. Pause for motion delay.
10. Place a test weight on scale.
11. Enter the test weight value with the [PRINT] and [UNITS] keys.
12. Press [TARE] to establish span.

13. Pause for motion delay.
14. Press [TARE] to accept calibration.
15. Press [TARE] to save calibration.
16. Press [TARE] to exit calibration.
17. Remove the calibration weight.

**Reset Calibration Gain Factors (355):**

1. Press [1] [0] [0] [SELECT].
2. Press [5] [4] [3] [2] ]1] [ENTER].
3. Remove any load on the scale.
4. Press [ENTER] to establish zero.
5. Place a test weight on scale.
6. Press [ZERO].
7. Remove any load on the scale.
8. Press [ENTER] to establish zero.
9. Pause for motion delay.
10. Place a test weight on scale.
11. Enter the test weight value with the numeric keys.
12. Press [ENTER] to establish span.
13. Pause for motion delay.
14. Press [ENTER] to accept calibration.
15. Press [ENTER] to save calibration.
16. Press [ENTER] to exit calibration.
17. Remove the calibration weight.

## 6.3.6 Multi-Point Linearization

If the load cell signal input to the indicator has good repeatability and stability, then using multi-point linearization during calibration may significantly improve the ultimate accuracy of the data displayed by the indicator. Parameter 119 (P119) enables or disables this feature. Initially, the same basic procedures as a normal calibration are used to perform a multi-point linearization. All of the prompts provided will be exactly the same as a standard calibration for each cal point up to the *Cal ~ Good?* prompt.

If items are consistantly being weighed on either the high or low end of the cell capacity, the points of calibration can be skewed to either end of the spectrum. Multi-point linearization can compensate for a cell that is non-linear. First Zero?

1. Remove all weight and press [TARE] or [ENTER].
2. From the Enter Load prompt key in the first calibration point and press [TARE] or [ENTER].
3. From the Add Load prompt add the weight of the first calibration point and press [TARE] or [ENTER].
4. For calibration points 2 -5; Simply add the weight which you want to use for the next calibration point, then key in the value of the applied weight and press [TARE] or [ENTER]. You may wish to add weight until the displayed weight differs from the actual applied weight and then perform the next calibration at that point.

### Reset Cal

1. Press [TARE] or [ENTER].
2. From the First Zero?prompt remove all weight and press [TARE] or [ENTER].
3. From the Enter Load prompt key in the first calibration point and press [TARE] or [ENTER].
4. From the Add Load prompt add the weight of the first calibration point and press [TARE] or [ENTER].
5. For calibration points 2 -5; Simply add the weight which you want to use for the next calibration point, then key in the total applied weight and press [TARE] or [ENTER]. You may wish to add weight until the displayed weight differs from the actual applied weight and then perform the next calibration at that point.

Up to five calibration points may be established using this procedure. However if fewer calibration points are required, simply press [TARE] or [ENTER] without entering a value at the PntX prompt.

After the last point is established, the indicator will prompt with *Cal ~ Good?* Press the [TARE] or [ENTER]. key to accept the calibration or press [ZERO] or [CLR] to backup and redo the last point as described below.

If you make a mistake at any point in the linearization process, simply press the [ZERO] or [CLR] key. The indicator w backup one step in the procedure to the previous linearization point.

After the linearization has been completed, the changes must be saved by pressing [TARE] or [ENTER] at the *Enter = Save* prompt. Otherwise the previous calibration data will remain in effect.

### Examining Calibration Results

If Multi-Point Linearization is enabled (P119), the ten Parameters P61130 thru P61139 show the calibration weights used and the resulting calculated factors. Otherwise the message *Not Used* is displayed.

### Establishing a Span

Once a zero reference has been established, the Model 350/355 displays *Enter ~ Load* and awaits the entry of a span (test load) value. This value may be entered before or after the test load has been applied.

If the calibration weight value was entered before applying the test weight, *Add ~ Load* is displayed indicating that the test weight should now be applied. Apply the test weight, press [TARE] or [ENTER] and exiting calibration.

If it is necessary to repeat the calibration process, press [ZERO] at the *Cal ~ Good?* prompt and repeat the calibration process.

***Establishing span with a 100lb test weight:***

1. Place a 100lb test weight on scale.
2. Enter [1] [0] [0].
3. Press [ZERO] or [ENTER] to establish span.
4. Pause for motion delay.

When making a significant change to the previous calibration, or when the calibration weight is less than 5% of full scale capacity, *ReCal ~ ???* will be displayed instead of *Cal ~ Good?* In this event it is recommended that the calibration be performed a second time. Press [TARE] or [ENTER] to recalibrate, or press [ZERO] to skip recalibration.

## 6.4 Exiting Calibration

Once zero and span have been established, the newly acquired calibration information must be saved to non-volatile memory before it will be realized in the Weigh Mode. When saving calibration, parameters changed in the setup mode are also saved with their new selections.

### To exit and save calibration information:

1. Press [TARE] or [ENTER] to accept calibration.
2. Press [TARE] or [ENTER] to save calibration.
3. Press [TARE] or [ENTER] to exit calibration.

### To exit without saving calibration information:

1. Press [TARE] or [ENTER] to accept calibration.
2. Press [ZERO].
3. Press [TARE] or [ENTER].
4. Press [TARE] or [ENTER] to exit calibration.

# 7 Legal for Trade

The Model 350/355 default parameter setup does not ensure compliance with legal-for-trade installations as mandated by local weights and measures authorities. This chapter contains information on NTEP and OIML regulations, sealing and audit trails, and other requirements.

Since legal-for-trade requirements may vary, you must ensure that the Model 350/355 installed in accordance with all local regulations.

## 7.1 NTEP Requirements

The National Type Evaluation Program (NTEP) is a widely accepted weights and measures standard in the United States, with most states abiding by some or all of the NTEP requirements. A complete list of these regulations is available in the "Handbook 44" publication distributed by the National Institute of Standards and Technology (NIST). For more information visit http://www.nist.gov.

*The Model 350/355 NTEP Certificate of Conformance (C.O.C.) is 98-092A3.*

In order to configure the Model 350 to comply with NTEP requirements, parameter P440-rstrc (restrict) must be enabled. This ensures the following:

- Serial data will not be received while in the Setup Mode.
- Received alpha characters will not be displayed.
- Numeric tare entries cannot be received through the serial port.
- Pressing [TARE] with a gross weight of zero (0) or keying in a tare value of zero (0) will not automatically switch to the net mode.
- Negative tare values are not accepted.
- Tare rounding is enforced.
- When the tare value is zero, the net mode is not selectable.

Where applicable, enabling the restrict parameter will over-ride the current setting of other parameters.

*If the counting feature is enabled, NTEP requires a label on the front of the indicator stating "The counting feature is not legal for trade". See Other Requirements on page 145 for other application specific considerations.*

### 7.1.1 NTEP Panel Mount Requirements

In addition to all other NTEP requirements, the serial number of a panel mounted unit must be visible from the outside front of the controller. The serial number on the Model 350 rear label must be engraved in the space provided on the panel mount tag (see Figure 7.1). These serial numbers MUST match. The tag is designed to be applied to the top right edge of the enclosure or to the lower right of the front of the unit. Drill pins (part number 38-04-2960) are supplied with the panel mount kit to mount the tag. The drill pins require a 1/16" hole.

**To install the panel mount tag:**

1. Remove the electronics.
2. Carefully score the case so the drill will not slip.
3. Drill the mounting holes with a 1/16" drill.
4. Gently tap the drill pins to secure the label to the case.
5. Clean out the case.
6. Re-install the electronics.

***Damage to the case or electronics is not covered by warranty.***

**Figure 7.1 Panel Mount Unit - Serial Number Tag (Die Cast Model)**

## 7.2 OMIL Requirements

The International Organization of Legal Metrology is an inter-governmental body which harmonizes the national metrology regulations of its world wide members. A list of regulation publications may be obtained from the Bureau International de Métrologie Légale (BIML) in Paris, France.

In order to configure the Model 350 to comply with OIML requirements, parameter P410-Euro must be enabled. Doing so will ensure the following:

- An over-load condition will result when the gross weight exceeds nine graduations over the full scale capacity.
- Full scale capacity is always referenced from the last zero calibration reference, not the last zero acquired by pressing [ZERO].

Most NTEP requirements will also apply. See the Other Requirements section below for additional considerations.

## 7.3 Other Requirements

Several parameters must be considered on an individual basis as their configuration may vary with different applications. These parameters include, but are not limited to:

| Parameter | Description | Comment |
|---|---|---|
| P110 | Full Scale Capacity | Verify proper scale capacity. |
| P111 | Division Size | Verify that the maximum allowable number of scale divisions are not exceeded. |
| P112 | Zero Track | Verify required selection. |
| P114 | Stability | Verify required selection. |
| P118 | Zero Range | Verify required selection. |
| P212 | Print Stability | Verify required selection. |

## 7.4 Sealing and Audit Trails

Most legal-for-trade installations will require the Model 350/355 to be sealed. A sealed indicator cannot be accessed for setup or calibration changes without breaking a physical seal or incrementing an event counter, thus providing evidence of tampering.

The Model 350/355 has two types of sealing provisions, a physical seal and a three event audit trail counter. Check with your local weights and measures authority to determine your requirements.

### 7.4.1 Physical Seal

The most common sealing method is a lead-wire seal. The Model 350 and Model 355 provide an easy means of applying this type of seal as shown in Figure 7.4 and Figure 7.5

Before applying a wire seal, move the program jumper to the 'NO' position as shown in Figure 7.2 and Figure 7.3. This will prevent access to the Setup and Calibration Modes.

## Program Jumpers

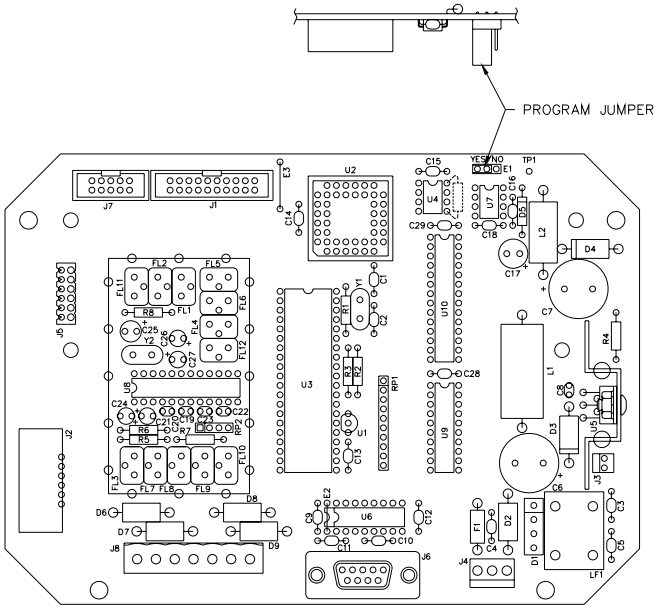



**Figure 7.2 Program Jumper Location (Die Cast Main Board)**

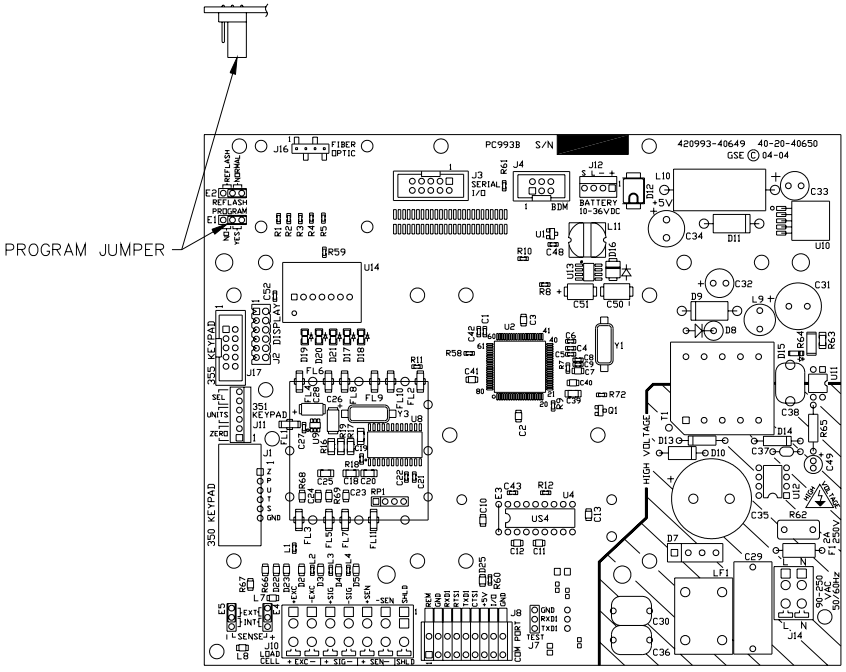



**Figure 7.3 Program Jumper Location (Stainless Steel Main Board)**

**Lead Wire Seal**

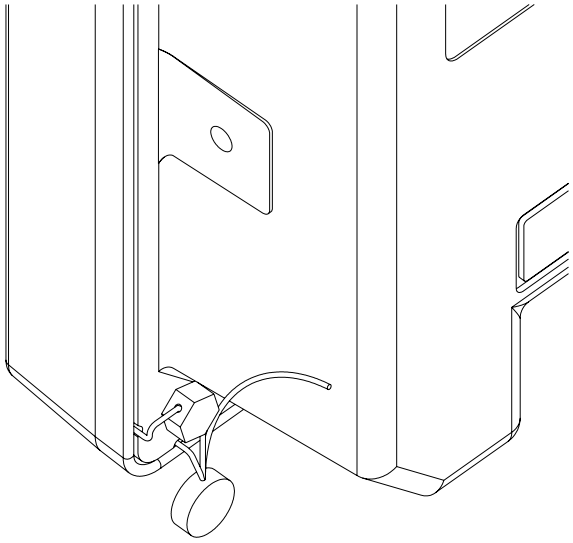


**Figure 7.4 Model 350 Die Cast Enclosure**

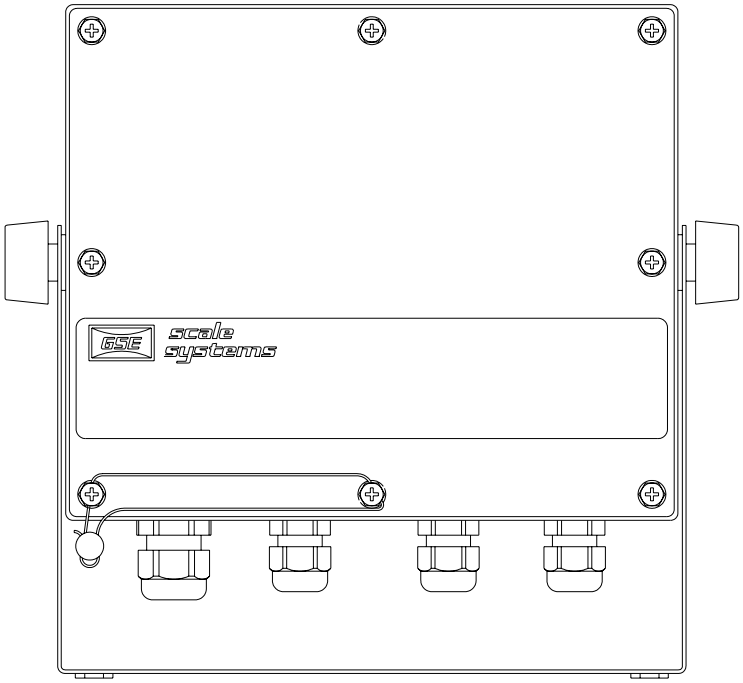



**Figure 7.5 Model 350/355 Stainless Steel Enclosure**

## 7.4.2 Audit Trails

Three separate incrementing, non-resetable audit trail parameters are used by the Model 350/355 to indicate changes to various parameters, P60201 - OIML, P60203 - Calibration , and P60204 - Setup. An audit trail counter will increment only once upon exiting the Setup Mode and saving changes regardless of how many settings were changed.

### OIML Audit Trail

Changes to any of the following parameters will increment the OIML (Euro) audit trail at P60201:

- P110 - P118 (scale setup)
- P150 (default units)
- P151 (units enable)
- P410 (Euro enable)
- P440 (rStrc enable)
- Existing Calibration

### Calibration Audit Trail

Any changes to the existing calibration will increment the Calibration (CAL) audit trail at P60203.

### Setup Audit Trail

Changes to any of the Setup Mode parameters will increment the setup audit trail at P60204.

### Viewing Audit Trail Parameters

Audit trail parameters may be viewed at any time.

***Model 350***

1. Press [ZERO] + [SELECT].
    - ❍ DISPLAY READS > Setup~Enter ~ Code!
2. Press [TARE].
    - ❍ DISPLAY READS > -No- ~ Chgs!~P110 ~ FS ~ xx.xx
3. Enter [60203] with the [PRINT] and [UNITS] keys.
    - ❍ DISPLAY READS > 60203
4. Press [SELECT] to view the selected audit trail.
    - ❍ DISPLAY READS > Audit ~ Trail~CAL. ~ 00001
5. Press [SELECT] again to view the Setup Audit Trail parameter.
    - ❍ DISPLAY READS > Audit ~ Trail~Setup. ~ 00003
6. Press [ZERO] to return to the Weigh Mode.
    - ❍ DISPLAY READS > 0.00

***Model 355***

1. Press 100 [SELECT]
    - ❍ DISPLAY READS > Setup~Enter ~ Code!
2. Press [ENTER]
    - ❍ DISPLAY READS > -No- ~ Chgs!~P110 ~ FS ~ xx.xx

3. Press 60203 [SELECT].
    - DISPLAY READS > Audit ~ Trail~CAL. ~ 00001
4. Press [SELECT] again to view the Setup Audit Trail parameter.
    - DISPLAY READS > Audit ~ Trail~Setup. ~ 00003
5. Press [SELECT] to return to the Weigh Mode.
    - DISPLAY READS > 0.00

# 8 Troubleshooting

This chapter contains error messages and information parameters, as well as information on setup parameter selections and A/D Calibration.

## 8.1 Error Messages

The Model 350/355 utilizes the following types of error messages: Operational Errors, Setup Mode Errors, Hardware Errors, Calibration Errors, Communication Errors, and Miscellaneous Errors.

### 8.1.1 Operational Errors

| | |
|---|---|
| **Code02** | Under Load. Input signal is less than negative full scale. Check load cell wiring. Verify correct capacity selection at P110. |
| **Code03** | Over Load. Input signal is greater than positive full scale. Use same checks as "under load" above. |
| **Funct ~ Disbl** | Attempted to perform a function disabled in the Setup Mode. |
| **Code 04** | The digits on the display have exceeded the six digit display capacity. |
| **Code 05** | Zero attempted beyond that allowed by P118. |
| **Code 08** | Input signal greatly exceeds the valid range. Check the load cell connection. |
| **Tare ~ Error** | Negative tare attempted when disabled (P440 enabled). |
| **Tare ~ GT FS** | Tare value greater than full scale capacity. |
| **Delay** | Indicates that a motion delay is in effect (zero, tare, etc.). |
| **Delay ~ Abort** | Acknowledges that a motion delayed function was aborted. |
| **Print ~ Abort** | Acknowledges that a motion delayed print request was aborted. |
| **Add ~ Load!** | If displayed after performing a count sample, this message indicates that a larger sample size is required. |
| **Out of ~ Range** | Attempted to enter a value beyond the allowable range. |
| **SPt 4~Error** | P5104 is based on quantity and the count parameter (P179) is disabled. |
| **Need APS** | A setpoint start is initiated and the setpoint is based on quantity and no piece weight has been established (start will not occur). |
| **Edit Disbl** | Unable to edit the time and date because P502 is disabled. |

## 8.1.2 Setup Mode Errors

| | |
|---|---|
| **Bad ~ Code!** | An incorrect access code was entered. |
| **Unit ~ Seald** | Access to the Setup or Calibration Mode was denied. Check the internal "YES/NO" program jumper. |
| **Unit3-Ntep Code 49.** | Parameter 440 (NTEP) is enabled and parameter 152 (third unit) is set to an additional unit. The third unit is not NTEP approved. |
| **Entry ~ Error** | An invalid entry was made. |
| **Need ~ Entry** | A numeric value was required before pressing [TARE]. |
| **Out of ~Range** | The entered value exceeded the allowable range. |
| **Can't ~ Set!** | Attempt to change a parameter that does not allow an entry. |
| **ResGT~ 260E3 Code 35.** | The number of divisions exceeds 260000 (see P110, P111). |
| **ResGT~ 25E3** | The number of divisions exceeds 25000 (see P110, P111). |
| **ResLT ~ 100!** | The number of divisions is less than 100 (see P110, P111). |
| **ResLT ~ 1 !!** | Number of divisions is less than one (see P110, P111). |
| **SPtxx ~ Error** | A conflict occurred with a setpoint value entry (example: target entry is less than preact).The digits 'xx' represent the last two digits of the setpoint parameter in error (example: SPt 5 ~ Error indicates a conflict P5105, preact 1). |
| **Prtcl ~ Error** | Existing protocol is invalid.The following are not allowed:<br>- P201 = 7 data bits, P202 = no parity, P203 = 1 stop bit<br>- P201 = 8 data bits, P202 = even parity, P203 = 2 stop bits<br>- P201 = 8 data bits, P202 = odd parity, P 203 = 2 stop bits |
| **Reboot! ~ to chang baud** | The current CPU speed at P60090 is low for the chosen baud rate. |

## 8.1.3 Hardware Errors

| | |
|---|---|
| **Code00** | A FRAM problem detected during power-up. |
| **A-D ~ Bad!Or Code17** | Problem with A/D chip detected. Disconnect any options installed and re-power the unit. Options are connected to the same serial lines as the A/D so they may prevent it from working properly. |
| **Deflt ~ A-D** | Bad A/D calibration values. Recalibrate A/D (see A/D Calibration Procedure on page 156). |
| **Re- ~ Boot!** | FRAM data could not be read. Attempting power-up reset. |
| **Chec ~ E2** | FRAM data error. |
| **Deflt ~ Setup** | An error occurred when reading setup data from the FRAM during power-up. All parameters are set to factory default. |
| **Ch.XXXX** | A checksum error occurred during power-up.All annunciators are lit. The FRAM integrity test failed or is improperly seated. |
| **E2 ~ Full!** | The FRAM setup exceeds the memory capacity. |
| **E2 rd Error** | Error reading EEProm. Send in for repair |
| **NoSpc ~ Free!** | The current setup exceeds the setup RAM capacity. |

### 8.1.4 Calibration Errors

| | |
|---|---|
| **F.S. ~TooHi** | The entered calibration weight will result in an over-capacity condition at full scale. Verify that the full scale (P110) and calibration weight value are correct. |
| **F.S. ~ TooLo** | The entered calibration weight will result in a full scale input signal less than the minimum allowed. Verify that the full scale (P110) and entered weight value are correct. |
| **Add ~ Load!** | The calibration weight is less than 0.1% of capacity. More weight is required. |
| **ReCal ~ ???** | Repeat the cal. procedure for accuracy. This prompt appears when the calibration weight is less than 5% of capacity, or when the A/D coarse gain is adjusted. |
| **Entry ~ Error** | An invalid entry was made. |

### 8.1.5 Communication Errors

| | |
|---|---|
| **Par-Er** | The selected parity (P202) does not match that of the connected device. |
| **Buf-Er** | The receive buffers capacity was exceeded. This indicates a handshaking problem. Check P204 and verify proper communication port connections. |
| **Bit-Er** | The stop bit of a received character did not occur when expected. Verify that protocol (P200 - P204) matches that of the connected device. |
| **Trans~Hold1** | Data transmission is inhibited due to a deasserted handshake on communication port 1. Press [ZERO] or [CLR] to abort transmission. Check P204. If in a Control and Hub configuration, press [ZERO] or [CLR] three times to clear the error. |
| **Trans~Hold2** | Data transmission is inhibited due to a deasserted handshake on communication port 2. Press [ZERO] or [CLR] to abort transmission. Check P204. Check P204. If in a Control and Hub configuration, press [ZERO] or [CLR] three times to clear the error. |
| **Error~BaudX** | The X being either comm port 1 or comm. port 2. The baud rate selected is too high for the microprocessor rate. Either set the baud rate lower or change the microprocessor rate at P60090 higher. |

### 8.1.6 Miscellaneous Errors

| | |
|---|---|
| T.X.YYYY | If catastrophic errors occur in the software, a trap error may occur and freeze the display with address information. (X = bank number and YYYY = the address of the trap error. Press any key five seconds after viewing message to reboot the unit). |

## 8.2 Viewing Setup Parameters

While troubleshooting it may be helpful to view the setup parameter selections. This can be done using the procedure below (even with the internal program jumper in the "NO" position). Note that accessing the Setup Mode in this manner will not permit parameter changes.

**To view the setup parameter selections (350):**

1. From the Weigh Mode, press [ZERO] + [SELECT].
2. Press [TARE].
3. Navigate the Setup Mode as described in Setup Mode on page 63.

**To view the setup parameter selections (355):**

1. From the Weigh Mode, press [1] [0] [0] [SELECT].
2. Press [ENTER].
3. Navigate the Setup Mode as described in Setup Mode on page 63.

**To exit the Setup Mode:**

1. Press [ZERO]
2. Press [ENTER]

## 8.3 Information Mode Parameters

A series of informational parameters are available beginning at P60000. These parameters may be accessed from the Setup Mode, or from the Weigh Mode as described below. Refer to Table 8.1 for an explanation of each information parameter.

**To access the informational parameters (350):**

1. Press [ZERO] + [SELECT]
2. Press [ZERO] [PRINT] [UNITS] [TARE]
3. Navigate the Setup Mode as described in Setup Mode on page 63.

**To access the informational parameters (355):**

1. Press [1] [0] [0] [SELECT]
2. Press [6] [0] [0] [0] [0] [ENTER]
3. Navigate the Setup Mode as described in Setup Mode on page 63.

As each information parameter is accessed, the parameter number is briefly displayed, followed by the parameter name, and finally the parameter value. To repeat the parameter number and name sequence, press [SELECT]. To exit the information mode, press [ZERO]

**Table 8.1 Information Parameters.**

| Parameter | Name | Description |
|---|---|---|
| **60000** | E2Ins | Total amount of FRAM storage. |
| **60001** | E2Fre | Amount of available FRAM storage. |
| **60090** | SPEEd | Set and view the microprocessor speed. The higher the speed of the processor, the more power consumption. The default value is 3.69 MHz. Press the [TARE] key on the 350 or [ENTER] key on the 355 to change the value. The value will not take affect until power is cycled. View the current processor speed by pressing [PRINT] or [UNITS]. |
| **60100** | -GSE- ~ c1998 | Copyright statement. |
| **60101** | 350 ~ 01001 | Firmware revision code. It is likely this code will be different than shown. |
| **60102** | 02- 10 ~ 1998 | Firmware date code. It is likely this code will be different than shown |
| **60200** | b sn ~ 10001 | Main circuit board serial number. It is likely this number will be different than shown |
| **60201** | Audit ~ Trail<br>Euro ~ 00000 | OIML (European) audit trail number (see OIML Audit Trail on page 144). |
| **60202** | i sn ~ 00000 | Model 350/355 serial number. It is likely this number will be different than shown |
| **60203** | Audit ~ Trail<br>CAL. ~ 00000 | Calibration audit trail number (see Calibration Audit Trail on page 148). |
| **60204** | Audit ~ Trail<br>Setup ~ 00000 | Setup audit trail number (see Setup Audit Trail on page 148). |
| **61100** | Load ~ Cell 0.00000 | Current mV/V output of the load cell. |
| **61101** | Cal ~ Factr 1.00000 | Calibration factor for the load cell. |
| **61102** | Rezro ~ Load 0.00000 | Amount of weight (in default units) zeroed through use of the [ZERO] key. |
| **61103** | Zrtrc ~ Load<br>0.00000 | Amount of weight (in default units) zeroed by the zero track feature since [ZERO] was last pressed. |
| **61104** | CZero ~ 0P | Coarse zero calculated during calibration. |
| **61105** | Fine ~ Zero 1738 | Fine zero calculated during calibration. |
| **61106** | CGain ~ 50 | Coarse gain calculated during calibration. |
| **61107** | Fine ~ Gain 1.00000 | Fine gain calculated during calibration. |
| **61110 > 61112** | Zero ~ Adj25 73741 > Zero ~ Ad100 -21813 | A/D compensation for coarse zero. |
| **61117 > 61120** | AiN1 ~ NrOff -11035 > AiN8 ~ NrOff -14800 | A/D non-ratio-metric offset compensation. |
| **61121** | Vre f~ NrOff -12739 | A/D reference voltage compensation. |
| **61122** | Alt~E=8 | Alt E=8 when the 8 volt excitation module is installed or Alt E=5 when 8 volt excitation module is not present. |
| **61200** | 10oFF | Analog option 0 - 10V Zero offset value. |
| **61201** | 10Gn | Analog option 0 - 10V Full scale gain value. |
| **61202** | 0oFF | Analog option 0 - 20mA Zero offset value. |
| **61203** | 0Gn | Analog option 0 - 20mA Full scale gain value. |
| **61204** | 4oFF | Analog option 4 - 20mA Zero offset value. |
| **61205** | 4Gn | Analog option 4 - 20mA Full scale gain value. |
| **61206** | SrIn | Analog option board serial number. |

| Parameter | Name | Description |
|---|---|---|
| **62000** | Dsply ~ Test 8.8.8.8.8.8. | Display test. Press [TARE] or [ENTER] to illuminate all segments. Continue pressing [TARE] or [ENTER] to cycle through various patterns. |
| **62001** | Spt 1 ~ Disbl | Allows setpoint status to be changed by pressing [TARE] or [ENTER] while viewing this parameter. Requires that setup was entered using the access code. |
| **62002** | Spt 2 ~ Disbl | |
| **62003** | Spt 3 ~ Disbl | |
| **62020** | AdAnl | Displays the voltage of the AC to DC power supply. Refer to P62021 if a battery in used. This parameter will still show a voltage when battery powered. This voltage reading will be slightly lower than what is display at P62021. |
| **62021** | AdbAt | Displays the voltage level on the battery when battery powered. Will show 0 if AC powered. |
| **64000** | Send ~ Setup | Transmits all setup information out the communication port. |
| **64100** | LnCnt ~ 0 | Received setup line count. |
| **64101** | ErCnt ~ 0 | Received setup error count. |
| **64102** | 1stEr ~ None! | Parameter of the first setup receive error. |
| **65001** | Deflt ~ All | Default All. Sets all parameters to factory default settings. Press [TARE] or [ENTER] to initiate default. |
| **65002** | Deflt ~ -CAL | Same as above, except calibration is retained. |
| **65020** | Re- ~ Flash | Used for firmware upgrade. If [ENTER] is pressed at P65020, the indicator's display will blank out and appear locked up. The only way to unlock this parameter is via a computer and terminal window software (ie. Communications Plus, Hyper terminal). See Upgrade Indicator Firmware on page 94 to upgrade firmware.<br>**To escape the firmware upgrade:**<br>1) Connect a computer to the serial port and use a terminal program such as CommPlus. Set the computer protocol to 9600,8,1,none.<br>2) Power up the indicator and the reflash menu will show in the terminal window.<br>3) Press the d key on the computer keyboard to quit the reflash process.<br>4) The indicator will return to a usable state. |

## 8.4 A/D Calibration Procedure

The Model 350/355 Analog-to-Digital Converter (A/D) is calibrated at the factory to ensure a stable, linear response to the load cell signal. This calibration procedure calculates critical values that are permanently stored in parameters P61110 - P61121. The A/D calibration should not be confused with the standard weight calibration. It should never be necessary to recalibrate the A/D. However, if the values stored at parameters P61110 - P61121 appear to be reset to 0.00000 and/or 1.00000, then A/D recalibration is necessary. Contact GSE or your local authorized GSE distributor for more information on this procedure.

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